AIR CONDITIONING SYSTEMS

Models:
U-MATCH ON/OFF

Service Manual

Service Manual

inventor

Your-conditions

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PRODUCT

PRODUCT

1 MODELS LIST

1.1 Outdoor Unit

Model	Nominal Capacity Cooling/Heating (Btu/h)	Ref.	Power Supply
ULS-09	8870/9720	R410a	220-240～,1,50
ULS-12	11940/12283	R410a	220-240～,1,50
ULS-18	17060/19448	R410a	220-240～,1,50
ULS-24	23884/27296	R410a	220-240～,1,50
ULS-36	33437/37532	R410a	220-240～,1,50
ULT-36	34120/37532	R410a	380-415～,3,50
ULT-45	40944/47768	R410a	380-415～,3,50
ULT-50	47768/52886	R410a	380-415～,3,50
ULT-60	54592/63122	R410a	380-415～,3,50

Note:1Ton =12000Btu/h = 3.517kW

1.2 Indoor Unit

Type	Model	Nominal Capacity Cooling/Heating (Btu/h)	Ref.	Power Supply
Duct Type	IDI-09	8870/9720	R410a	220-240～ 1Ph 50Hz
	IDI-12	11940/12283		
	IDI-18	17060/19448		
	IDI-24	23880/27300		
	IDI-36	33437/37500		
	IDI-45	42000/48000		
	IDI-50	48000/53000		
	IDI-60	60000/63120		
Floor-Ceiling Type	IKI-09	8870/9720	R410a	220-240～ 1Ph 50Hz
	IKI-12	11940/12283		
	IKI-18	17060/19448		
	IKI-24	23880/27300		
	IKI-36	33437/36781		
	IKI-45	42000/48000		
	IKI-50	48000/53000		
Cassette Type	ICI-12	11940/12283	R410a	220-240～ 1Ph 50Hz
	ICI-18	17060/19448		
	ICI-24	23201/25590		
	ICI-36	36000/37500		
	ICI-45	42000/48000		
	ICI-50	48000/53000		

Note:1 Ton =12000Btu/h = 3.517kW

NOTES：

The universal outdoor unit means that the customer can choose any of three kind of indoor unit to match the outdoor unit without any change with it.

2 NOMENCLATURE

NO.	Description	Options
1	INVENTOR	
2	Unit Type	U=Match Outdoor Unit F=Duct Type K=Cassette Type T= Ceiling Type
3	Product Type	C=Cool Only H=Heat Pump without Aux Electric Heaters
4	Power Supply Code	N=Constant Frequency D=DC Inverter A=AC Inverter
5	Nominal Cooling Capacity	Nominal Cooling Capacity =Number×1000Btu/h
6	Climate Type	N=Climate T1 Condition T= Climate T3 Condition
7	Power Supply Code	K=1Ph 220~240V 50HZ M=3Ph 380~415V 50HZ
8	Refrigerant	1 =R22 2=R407C 3=R410A
9	Design Code	Design Code:A,B,C,D……
10	Unit Code for Condensing Unit or Indoor Unit	O=Outdoor I=Indoor Unit

3 FUNCTION

Function	Description
Memory function	when unit restart after power off, it will run on former status, the mode and parameter are kept the same
Remote control function	wireless controller and remote controller can be opted, and the maximum control distance of remote controller is 10m.
Timing function	it can timing ON/ OFF separately, meanwhile, it can also can timing on circularly
Self-diagnosis with alarm function	once unit has malfunction, the malfunction code will be indicated and alarm ring immediately
Sleep function	it can self control for saving energy in energy saving mode.
Automatic function	the fan of indoor unit can adjust fan speed automatically based on actual demand when cooling or heating under automatic mode
Cool air proof function	the fan starts only when the temperature of indoor unit heat exchanger is higher than indoor temperature under heating mode
Weekly Timer	Centralized Control and Week Timer Functions: The centralized controller and the weekly timer are integrated in the same wire controller. The system has both the centralized control and the week timing functions. Up to 16 sets of units can be controlled simultaneously by the centralized controller (weekly timer). The weekly timer has the function of invalidating the lower unit. The weekly timing function is able to realized four timing ON/OFF periods for any unit every day, so as to achieve fully automatic operation. No timing control can be set for holidays.
High/low pressure protection	when suction pressure is too low or discharge pressure is too high, compressor will stop and unit display malfunction code
Overload protection	compressor has its own overheat protection, once the temperature of compressor is higher than allowable level, compressor will stop and only when temperature recovery, compressor restart
Over current protection	once the current of compressor is higher that normal level, compressor will stop and unit display malfunction code
Discharge high temperature protection	once the discharge temperature of compressor is higher than allowable value, compressor will stop and unit display malfunction code
Reverse (open) phase protection	once the phase sequence of power supply is incongruent or the phase is absent, unit can’t work and display malfunction code
Anti-high temperature protection	once the heat exchanger temperature of indoor unit is too high, compressor stop and unit display malfunction code.
Timing ON/OFF display	display and timing turn ON/OFF time
Fan speed display	display the speed (high, medium, low) of fan
Function model display	cooling mode, dehumidifying mode, heating mode, fan mode
Testing display	display testing mode
Temperature display	display room temperature and set temperature

4 PRODUCT DATA

4.1 Product Data at Rated Condition

4.1.1 Duct Type

Model	Indoor unit		IDI-09	IDI-12	IDI-18
	Outdoor unit		ULS-09	ULS-12	ULS-18
Nominal Capacity	Cooling	kW	2.6	3.5	5.0
		Btu/h	8870	11940	17060
	Heating	kW	2.85	3.6	5.7
		Btu/h	9720	12283	19448
Power Input	Cooling	kW	1.35	1.2	2.1
	Heating	kW	1.4	1.1	1.8
EER/COP		W/W	2.6/2.94	2.92/3.55	2.38/3.22
Indoor Unit			IDI-09	IDI-12	IDI-18
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.02×2	0.02×2	0.07×2
	Air Flow	m^3/h	550	600	840
	Ext. Static Pressure	Pa	25	25	40
Sound Pressure Level（H/M/L）		dB(A)	37 / 36 /34	40/38/36	42/40/38
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ20×1.2	φ20×1.2	φ30×1.5
Dimensions (H×W×D) (Outline/Package)		mm	220×913×680/ 258×995×750	220×913×680/ 258×995×750	266×1012×736 308×1120×795
Weight（Net/Gross）		kg	27/32	27/32	36/39
Outdoor Unit			ULS-09	ULS-12	ULS-18
Power Supply		—	220-240V~/1Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.03	0.03	0.03
	Fan Motor Speed	rpm	850		
Compressor	Type	—	ROTARY		
	Motor Output	kW	0.922	1.185	1.9
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	1.1	1.0	1.5
Dimensions (H×W×D) (Outline/Package)		mm	540×848×320/ 590×878×360	540×848×320/ 590×878×360	540×848×320/ 590×878×360
Weight（Net/Gross）		kg	32/37	32/37	40/45
Piping Connections	Liquid	mm	6.35	6.35	6.35
	Gas	mm	9.52	12.7	12.7
	Max. Length	m	20	20	20

	Max. Height Difference	m	15	15	15

Continued 1

Model	Indoor unit	IDI-24	IDI-36	IDI-36

	Outdoor unit		ULS-24	ULS-36	ULS-36
Nominal Capacity	Cooling	kW	7.0	9.8	10
		Btu/h	23880	33437	36000
	Heating	kW	8.0	11	11
		Btu/h	27300	37500	37500
Power Input	Cooling	kW	2.66	4.0	4.0
	Heating	kW	2.51	3.5	3.5
EER/COP		W/W	2.63/3.19	2.5/3.14	2.5/3.14
Indoor Unit			IDI-24	IDI-36	IDI-36
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.15×2	0.5×2	0.5×2
	Air Flow	m^3/h	1400	2000	2000
	Ext. Static Pressure	Pa	80	150	150
Sound Pressure Level（H/M/L）		dB(A)	44 / 42 /40	50 / 48 /46	50 / 48 /46
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ20×1.2	φ20×1.2	φ20×1.2
Dimensions (W×H×D) (Outline/Package)		mm	1270 ×268×504/ 1345×268×594	1251×290×744/ 1335× 290× 834	1251×290×744/ 1335× 290× 834
Weight（Net/Gross）		kg	37/45	57/67	57/67
Outdoor Unit			ULS-24	ULT-36	ULS-36
Power Supply		—	220-240V~/1Ph/50 HZ	380-415V~/3Ph/50 HZ	220-240V~/1Ph/50 HZ
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.068×1	0.092×2	0.092×2
	Fan Motor Speed(H/M/L)	rpm	840/620/400	940/840/700	940/840/700
Compressor	Type	—	ROTARY	SCROLL	SCROLL
	Motor Output	kW	2.475	3.65	3.8
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	2.2	3.2	3.2
Dimensions (W×H×D) (Outline/Package)		mm	1018×700× 412/ 1100 ×755× 450	1018 ×8 40×412/ 1110 × 985 × 450	1018 ×8 40×412/ 1110 ×985 × 450
Weight（Net/Gross）		kg	59/64	90/100	90/100
Piping Connections	Liquid	mm	9.52	12.7	12.7
	Gas	mm	15.8	19.05	19.05
	Max. Length	m	30	50	50

	Max. Height Difference	m	15	30	30

Continued:2

Model	Indoor unit		IDI-45	IDI-50	IDI-60
	Outdoor unit		ULT-45	ULS-48N	ULS-60
Nominal Capacity	Cooling	kW	12	14	16
		Btu/h	42000	48000	60000
	Heating	kW	14	15.5	18.5
		Btu/h	48000	53000	63120
Power Input	Cooling	kW	5.3	5.8	6.5
	Heating	kW	4.9	5.4	5.5
EER/COP		W/W	2.26/2.86	2.41/2.87	2.46/3.27
Indoor Unit			IDI-45	IDI-50	IDI-60
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.5×2		
	Air Flow	m^3/h	2000	2300	2500
	Ext. Static Pressure	Pa	150	150	150
Sound Pressure Level（H/M/L）		dB(A)	50 / 48 /46	50 / 48 /46	53 / 50 /48
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ20×1.2	φ20×1.2	φ32×1.5
Dimensions (W×H×D) (Outline/Package)		mm	1251× 290 ×744/ 1335 × 290× 834	1251×290×744/ 1335× 290× 834	1251×330×788/ 1334 ×330 × 882
Weight（Net/Gross）		kg	57/67	57/67	66/76
Outdoor Unit			ULT-45	ULT-50	ULT-60
Power Supply		—	380-415V~/3 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.092×2		
	Fan Motor Speed(H/M/L)	rpm	940/840/700	940/840/700	940/840/700
Compressor	Type	—	SCROLL		
	Motor Output	kW	4.75	4.5	5.75
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	3.55	3.8	5.0
Dimensions (W×H×D) (Outline/Package)		mm	1018×700× 412 /1100 ×755×450	950×1250×412 /1110×1385×450	950×1250×412 /1110×1385×450
Weight（Net/Gross）		kg	112/123	112/123	123/134
Piping Connections	Liquid	mm	12.7	12.7	12.7
	Gas	mm	19.05	19.05	22.2

	Max. Length	m	50
	Max. Height Difference	m	30

Note：

① Nominal capacities are based on the follow conditions.

	Indoor	Outdoor
Cooling	DB：27℃(80.6℉) WB：19℃(66.2℉)	DB：35℃(95℉) WB：24℃(75.2℉)
Heating	DB：20℃(68℉) WB：--℃(--℉)	DB：7℃(44.6℉) WB：6℃(42.8℉)
Piping Length	5m	

② The air volume is measured at the relevant standard external static pressure.

③ Noise is tested in the Semi anechoic Room, so it should be slightly higher in the actual operation due to environmental change.

4.1.2 Ceiling Type

Models	Indoor unit		IKI-09	IKI-12	IKI-18
	Outdoor unit		ULS-09	ULS-12	ULS-18
Nominal Capacity	Cooling	kW	2.6	3.5	5.0
		Btu/h	8870	11940	17060
	Heating	kW	2.85	3.6	5.7
		Btu/h	9720	12280	19448
Power Input	Cooling	kW	1	1.17	2.03
	Heating	kW	1	1.1	2.07
EER/ COP		W/W	2.6/2.85	2.99/3.55	2.46/2.8
Indoor Unit			IKI-09	IKI-12	IKI-18
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.01×2	0.01×2	0.04×2
	Air Flow	m^3/h	550	550	700
Sound Pressure Level（H/M/L）		dB(A)	47/44/41	46/44/41	54/50/46
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ28×1.5		
Dimensions (W×H×D) (Outline/Package)		mm	836×238×695/ 935×295×805	836×238×695/ 935×295×805	836×238×695/ 935×295×805
Weight（Net/Gross）		kg	27/35.5	27/35.5	32/36
Outdoor Unit			ULS-09	ULS-12	ULS-18
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.03	0.03	0.03
	Fan Motor Speed	rpm	850	850	850
Compressor	Type	—	ROTARY		
	Motor Output	kW	0.922	1.185	1.9
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	1.1	1.0	1.5
Dimensions (W×H×D) (Outline/Package)		mm	848×540×320 /878×590×360	848×540×320 /878×590×360	848×540×320 /878×590×360
Weight（Net/Gross）		kg	32/37	32/37	40/45
Piping Connections	Liquid	mm	6.35	6.35	6.35
	Gas	mm	9.52	12.7	12.7
	Max. Length	m	20	20	20

	Max. Height Difference	m	15	15	15

Continued 1

Models	Indoor unit		IKI-24	IKI-36	IKI-36
	Outdoor unit		ULS-24	ULT-36	ULS-24
Nominal Capacity	Cooling	kW	7.0	9.8	10
		Btu/h	23880	33440	36000
	Heating	kW	8.0	10.78	11
		Btu/h	27300	36780	37500
Power Input	Cooling	kW	2.61	3.6	3.6
	Heating	kW	2.59	3.3	3.3
EER/ COP		W/W	2.68/3.09	2.78/3.33	2.78/3.33
Indoor Unit			IKI-24	IKI-36	IKI-36
Power Supply		—	220-240V~/1Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.1×4	0.085×2	0.085×2
	Air Flow	m^3/h	1170	1800	1800
Sound Pressure Level（H/M/L）		dB(A)	50/48/46	54/51/48	54/51/48
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ28×1.5		
Dimensions (H×W×D) (Outline/Package)		mm	1300×188×600 /1414×248×724	1590×238×695/ 1714×330×830	1590×238×695/ 1714×330× 830
Weight（Net/Gross）		kg	32/36	42/51	42/51
Outdoor Unit			ULS-24	ULT-36	ULS-24
Power Supply		—	220-240V~/1Ph/50 HZ	380-415V~/3Ph/50 HZ	220-240V~/1Ph/50 HZ
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.068	0.092×2	0.092×2
	Fan MotorSpeed(H/M/L)	rpm	840/620/400	940/840/700	940/840/700
Compressor	Type	—	ROTARY	SCROLL	SCROLL
	Motor Output	kW	2.475	3.65	3.8
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	2.2	3.2	3.2
Dimensions (W×H×D) (Outline/Package)		mm	1018 ×700×412/ 1100×755×450	1018×840×412/ 1110×985×450	1018×840×412/ 1110×985×450

Weight（Net/Gross）		kg	59/64	90/100	90/100
Piping Connections	Liquid	mm	9.52	12.7	12.7
	Gas	mm	15.8	19.05	19.05
	Max. Length	m	30	50	50
	Max. Height Difference	m	15	30	30

Continued 2

Models	Indoor unit		IKI-45	IKI-50
	Outdoor unit		ULT-45	ULT-50
Nominal Capacity	Cooling	kW	12	14
		Btu/h	42000	48000
	Heating	kW	14	15.5
		Btu/h	48000	53000
Power Input	Cooling	kW	4.8	6.1
	Heating	kW	4.7	5.8
EER/ COP		W/W	2.5/2.98	2.3/2.67
Indoor Unit			IKI-45	IKI-50
Power Supply		—	220-240V~/1Ph/50HZ	
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Centrifugal fan	
	Drive	—	Direct Driver	
	Motor Output	kW	0.085×2	0.18×2
	Air Flow	m^3/h	1800	2100
Sound Pressure Level（H/M/L）		dB(A)	54/51/48	58/55/52
Air Filter		—	Standard washable synthetic	
Drain Piping		mm	φ28×1.5	
Dimensions (W×H×D) (Outline/Package)		mm	1590×238×695 1714×330×830	1590×238×695/ 1714×330×830
Weight（Net/Gross）		kg	42/51	42/51
Outdoor Unit			ULT-45	ULT-50
Power Supply		—	380-415V~/3 Ph/50HZ	
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Axial fan	
	Motor Output	kW	0.092×2	0.092×2
	Fan MotorSpeed(H/M/L)	rpm	940/840/700	940/840/700
Compressor	Type	—	SCROLL	
	Motor Output	kW	4．75	4.5
Refrigerant	Type	—	R410A	
	Control	—	Capillary Tube	
	Charge	kg	3．55	3.8

Dimensions (W×H×D) (Outline/Package)		mm	950×1250×412/ 1110 ×1385× 450	950×1250×412/ 1110 ×1385× 450
Weight（Net/Gross）		kg	112/123	
Piping Connections	Liquid	mm	12.7	
	Gas	mm	19.05	
	Max. Length	m	50	
	Max. Height Difference	m	30	

Note：

① Nominal capacities are based on the follow conditions.

	Indoor	Outdoor
Cooling	DB：27℃(80.6℉) WB：19℃(66.2℉)	DB：35℃(95℉) WB：24℃(75.2℉)
Heating	DB：20℃(68℉) WB：--℃(--℉)	DB：7℃(44.6℉) WB：6℃(42.8℉)
Piping Length	5m	

② The air volume is measured at the relevant standard external static pressure.

③ Noise is tested in the Semianechoic Room, so it should be slightly higher in the actual operation due to environmental change.

4.1.3 Cassette Type

Models	Indoor unit		ICI-12	ICI-18	ICI-24
	Outdoor unit		ULS-12	ULS-18	ULS-24
Nominal Capacity	Cooling	kW	3.5	5.0	6.8
		Btu/h	11940	17060	23200
	Heating	kW	3.6	5.7	7.5
		Btu/h	12280	19450	25590
Power Input	Cooling	kW	1.17	2.0	2.62
	Heating	kW	1.1	1.9	2.5
EER/COP		W/W	2.8/3.2	2.5/3.05	2.67/3.2
Indoor Unit			ICI-12	ICI-18	ICI-24
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Centrifugal fan		
	Drive	—	Direct Driver		
	Motor Output	kW	0.011	0.011	0.035
	Air Flow	m^3/h	550	600	1180
Sound Pressure Level（H/M/L）		dB(A)	47/45/43		
Air Filter		—	Standard washable synthetic		
Drain Piping		mm	φ31×3	φ31×3	φ32×3
Indoor Unit Dimensions (Outline/Package) (W×H×D)		mm	600×230×600/ 848×310×678	600×230×600/ 848×310×678	840×260×840/ 960×310×960
Panel Dimensions (Outline/Package) (H×W×D)		mm	50×650×650/ 102×730×670	50×650×650/ 102×730×670	60×950×950/ 115×1040×1025
Weight（Net/Gross）		kg	20/27	20/27	30 / 38
Outdoor Unit			ULS-12	ULS-18	ULS-24
Power Supply		—	220-240V~/1 Ph/50HZ		
Heat Exchange		—	Cross Fin Coil		
Fan	Type	—	Axial fan		
	Motor Output	kW	0.03	0.03	0.068
	Fan Motor Speed(H/M/L)	rpm	850	850	840/620/400
Compressor	Type	—	ROTARY		
	Motor Output	kW	1.185	1.9	2.475
Refrigerant	Type	—	R410A		
	Control	—	Capillary Tube		
	Charge	kg	1.0	1.5	2.2

Dimensions (W×H×D) (Outline/Package)		mm	848×540×320/ 878×590×360	848×540×320/ 878×590×360	1018×700×412/ 1100×755×450
Weight（Net/Gross）		kg	32/37	40/45	59/64
Piping Connections	Liquid	mm	6.35	6.35	9.52
	Gas	mm	12.7	12.7	15.8
	Max. Length	m	20	20	30
	Max. Height Difference	m	15	15	15

Continued 1

Models	Indoor unit		ICI-36	ICI-36
	Outdoor unit		ULT-36	ULS-36
Nominal Capacity	Cooling	kW	10	10
		Btu/h	36000	36000
	Heating	kW	11	11
		Btu/h	37500	37500
Power Input	Cooling	kW	3.6	3.6
	Heating	kW	3.1	3.3
EER/COP		W/W	2.78/3.55	2.78/3.33
Indoor Unit			ICI-36	ICI-36
Power Supply		—	220-240V~/1 Ph/50HZ	
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Centrifugal fan	
	Drive	—	Direct Driver	
	Motor Output	kW	0.06	
	Air Flow	m^3/h	1600	1800
Sound Pressure Level（H/M/L）		dB(A)	53/51 /48	
Air Filter		—	Standard washable synthetic	
Drain Piping		mm	φ32×3	
Indoor Unit Dimensions (Outline/Package) (W×H×D)		mm	840×320×840/ 960×394×960	
Panel Dimensions (Outline/Package) (H×W×D)		mm	60×950×950/ 115×1040×1025	
Weight（Net/Gross）		kg	38/46	
Outdoor Unit			ULT-36	ULS-36
Power Supply		—	380-415V~/3Ph/50HZ	220-240V~/1Ph/50HZ
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Axial fan	
	Motor Output	kW	0.092×2	
	Fan Motor Speed(H/M/L)	rpm	940/840/700	
Compressor	Type	—	SCROLL	
	Motor Output	kW	3.65	3.8
Refrigerant	Type	—	R410A	
	Control	—	Capillary Tube	
	Charge	kg	3.2	
Dimensions (W×H×D) (Outline/Package)		mm	1018× 840 ×412 1110 ×985×450	
Weight（Net/Gross）		kg	90/100	
Piping Connections	Liquid	mm	12.7	
	Gas	mm	19.05	
	Max. Length	m	50	
	Max. Height Difference	m	30	

Continued 2

Models	Indoor unit		ICI-45	ICI-50
	Outdoor unit		ULT-45	ULT-50
Nominal Capacity	Cooling	kW	12	14
		Btu/h	42000	48000
	Heating	kW	14	15.5
		Btu/h	48000	53000
Power Input	Cooling	kW	4.8	5.8
	Heating	kW	5.0	6.2
EER/COP		W/W	2.5/2.8	2.3/2.67
Indoor Unit			ICI-45	ICI-50
Power Supply		—	220-240V~/1 Ph/50HZ	
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Centrifugal fan	
	Drive	—	Direct Driver	
	Motor Output	kW	0.06	
	Air Flow	m^3/h	1650	1700
Sound Pressure Level（H/M/L）		dB(A)	53/ 51 /48	
Air Filter		—	Standard washable synthetic	
Drain Piping		mm	φ32×3	
Indoor Unit Dimensions (Outline/Package) (H×W×D)		mm	840×320×840/ 960×394×960	
Panel Dimensions (Outline/Package) (H×W×D)		mm	60×950×950/ 115×1040×1025	
Weight（Net/Gross）		kg	38/46	
Outdoor Unit			ULT-45	ULT-50
Power Supply		—	380-415V~/3 Ph/50HZ	
Heat Exchange		—	Cross Fin Coil	
Fan	Type	—	Axial fan	
	Motor Output	kW	0.092×2	
	Fan Motor Speed(H/M/L)	rpm	940/840/700	
Compressor	Type	—	SCROLL	
	Motor Output	kW	4.75	4.5
Refrigerant	Type	—	R410A	
	Control	—	Capillary Tube	
	Charge	kg	3.55	3.8
Dimensions (W×H×D) (Outline/Package)		mm	950×1250×412/ 1110 × 1385 ×450	
Weight（Net/Gross）		kg	112/123	
Piping Connections	Liquid	mm	12.7	
	Gas	mm	19.05	
	Max. Length	m	50	
	Max. Height Difference	m	30	

Note：

① Nominal capacities are based on the follow conditions.

	Indoor	Outdoor
Cooling	DB：27℃(80.6℉) WB：19℃(66.2℉)	DB：35℃(95℉) WB：24℃(75.2℉)
Heating	DB：20℃(68℉) WB：--℃(--℉)	DB：7℃(44.6℉) WB：6℃(42.8℉)
Piping Length	5m	

② The air volume is measured at the relevant standard external static pressure.

③ Noise is tested in the Semianechoic room, so it should be slightly higher in the actual operation due to environmental change.

4.2 Operation Range

Mode	Range of Outdoor Temperature℃ (℉)
Cooling	18℃-43℃ -7℃-43℃(with low Ambient kit)
Heating	-7℃-24℃

4.3 Electrical Data

Model		Compressor				Fan Motor		Max. Fuse Breaker Size (Indoor/Outdoor)	Min. Disconnect Size (Indoor/Outoor)
		Power Supply	Qty.	LRA	RLA	Condenser Fan Motors	Supply Blower Motor		
		V,Ph,Hz	—	Each	Each	FLA Each	FLA Each	Amperes	Amperes
ULS-09	IDI-09	220-240 1 50	1	18	4.28	0.27	0.18	6/10	1/5.7
	IDI-09						0.09	6/10	1/5.7
ULS-12	IDI-12		1	32	5.6	0.27	0.18	6/13	1/7.3
	IKI-12						0.09	6/13	1/7.3
	ICI-12						0.1	6/13	1/7.3
ULS-18	ICI-18		1	40	8.8	0.27	0.63	6/20	1.5/11.3
	ICI-18						0.36	6/20	1/11.3
	ICI-18						0.1	6/20	1/11.3
ULS-24	ICI-24		1	60	11.2	0.61	1.35	6/25	2.5/14.6
	ICI-24						0.9	6/25	1.5/14.6
	ICI-24						0.32	6/25	1/14.6
ULS-36	ICI-36		1	97	18.42	0.8	4.5	10/40	5.7/23.8
	ICI-36						1.35	6/40	2.5/23.8
	ICI-36						0.54	6/40	1/23.8
ULT-36	ICI-36	380-415~ 3 50	1	67	6.58	0.8	4.5	10/16	5.7/9.1
	ICI-36						1.35	6/16	2.5/9.1
	ICI-36						0.54	6/16	1/9.1
ULT-45	ICI-45		1	66	8.22	0.8	4.5	10/20	5.7/11.1
	ICI-45						1.35	6/20	2.5/11.1
	ICI-45						0.54	6/20	1/11.1
ULT-50	ICI-50		1	59.4	8	0.8	4.5	10/16	5.7/10.8
	ICI-50						1.62	6/16	2.5/10.8
	ICI-50						0.54	6/16	1/10.8
ULT-60	ICI-60		1	67	9.77	0.8	4.5	10/20	5.7/13

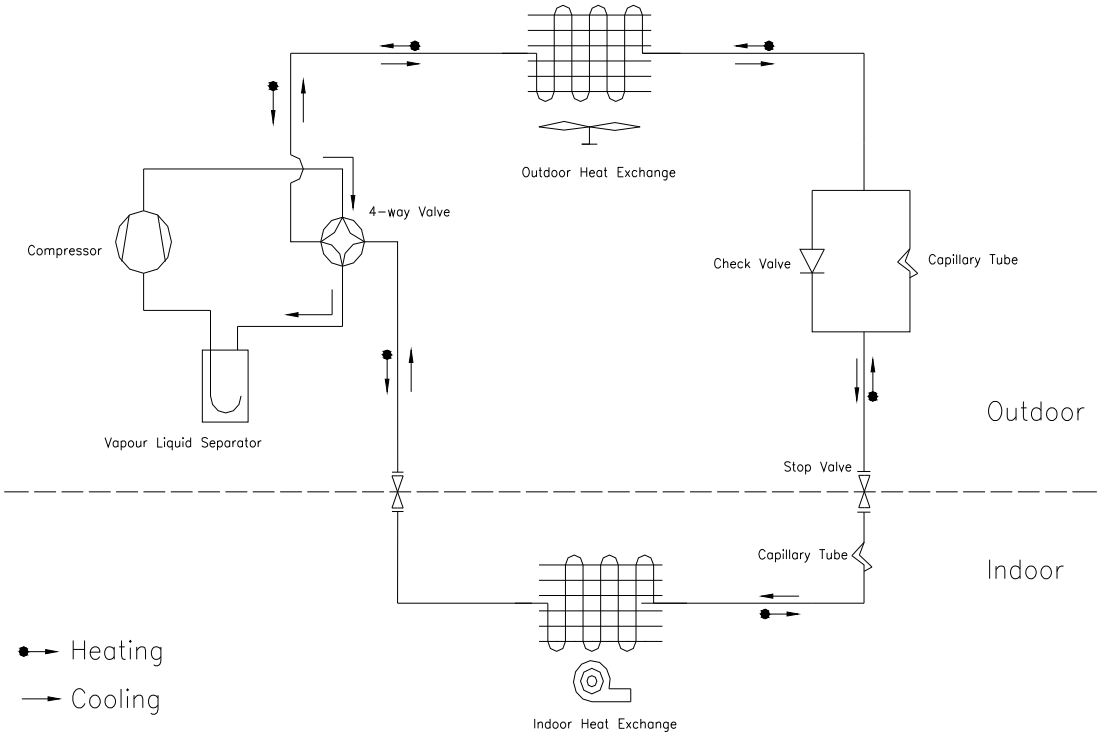
Notes：

RLA：Rated load amperes

LRA：Locked rotor amperes

FLA：Full load current

5 PIPING DIAGRAM

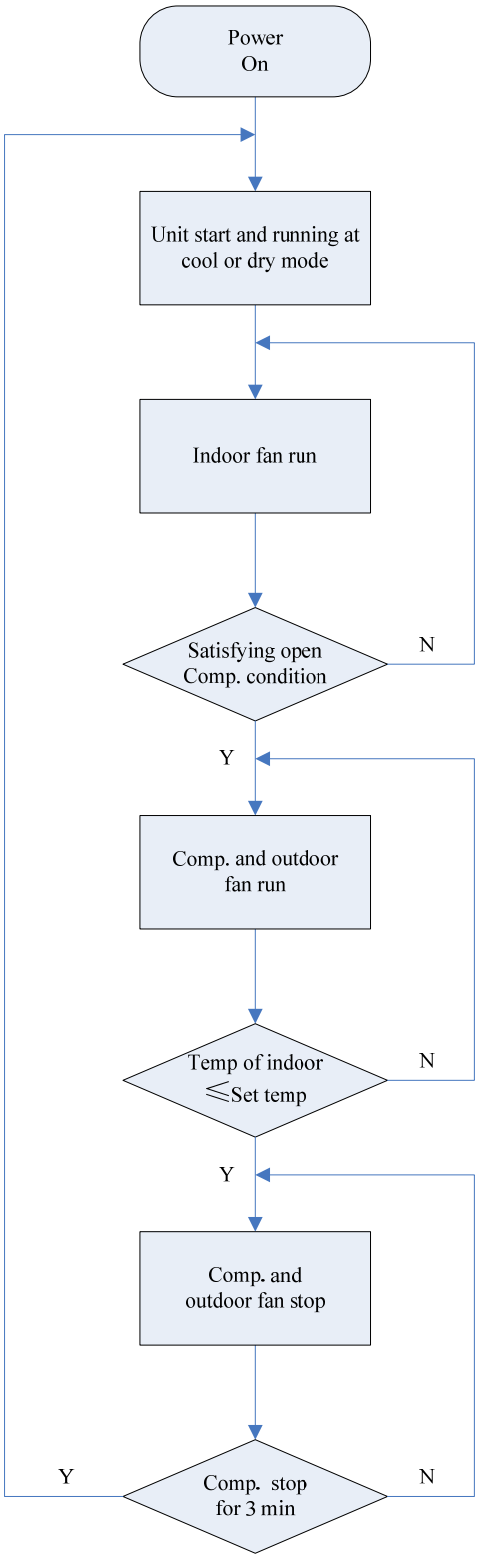


CONTROL

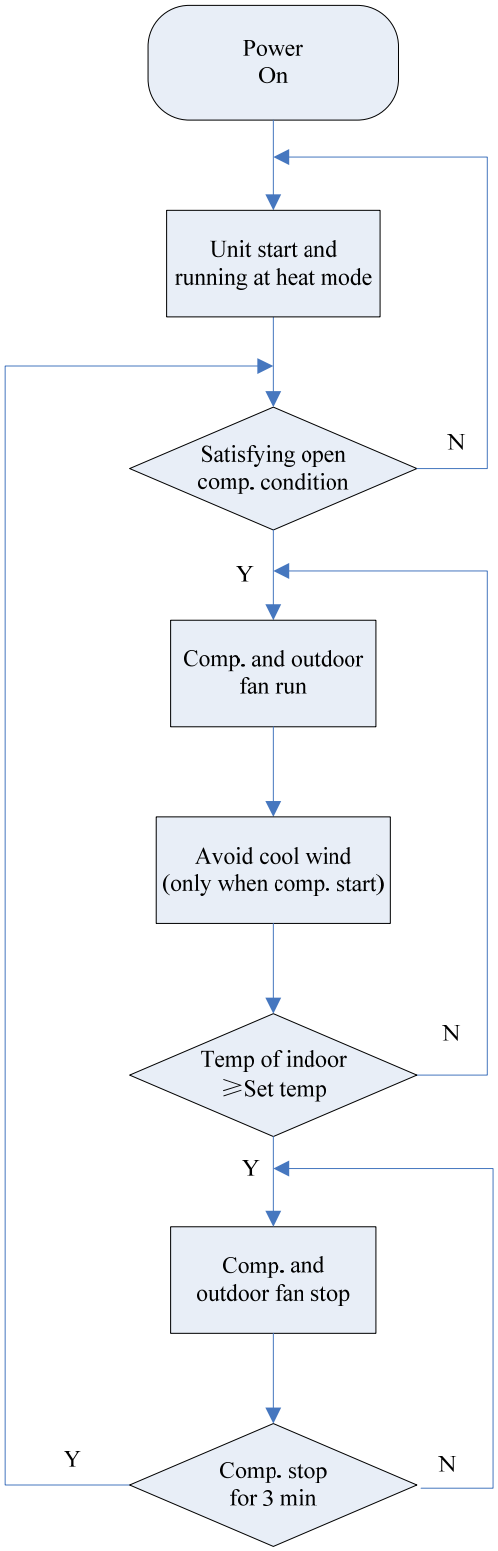
CONTROL

1 OPERATION FLOWCHART

1.1 Cooling/Dry Operation

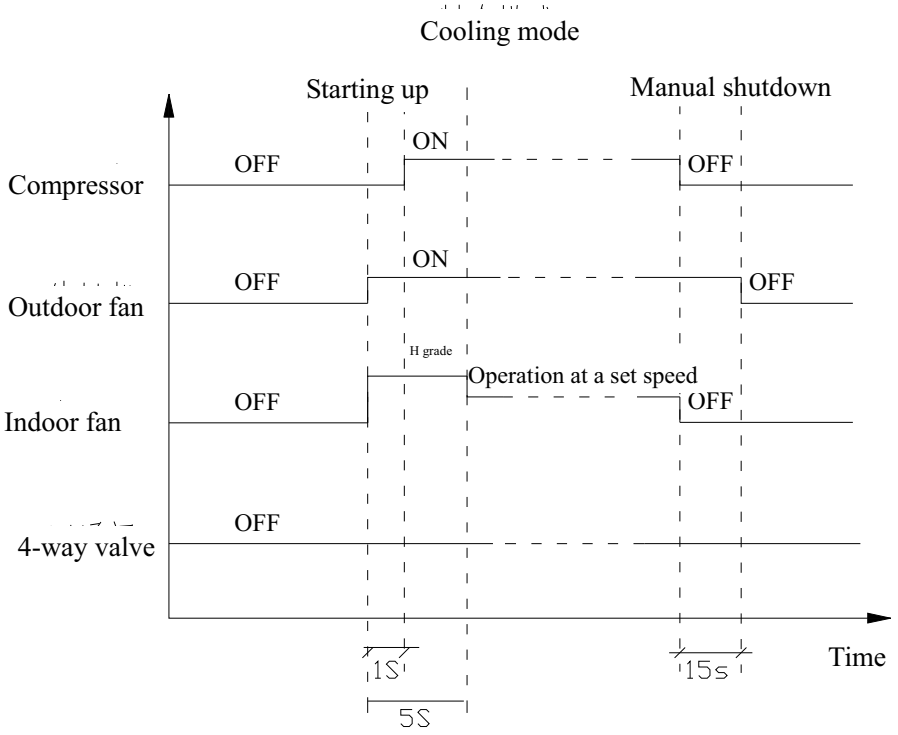


1.2 Heating Operation



2 MAIN LOGIC

2.1 Cooling

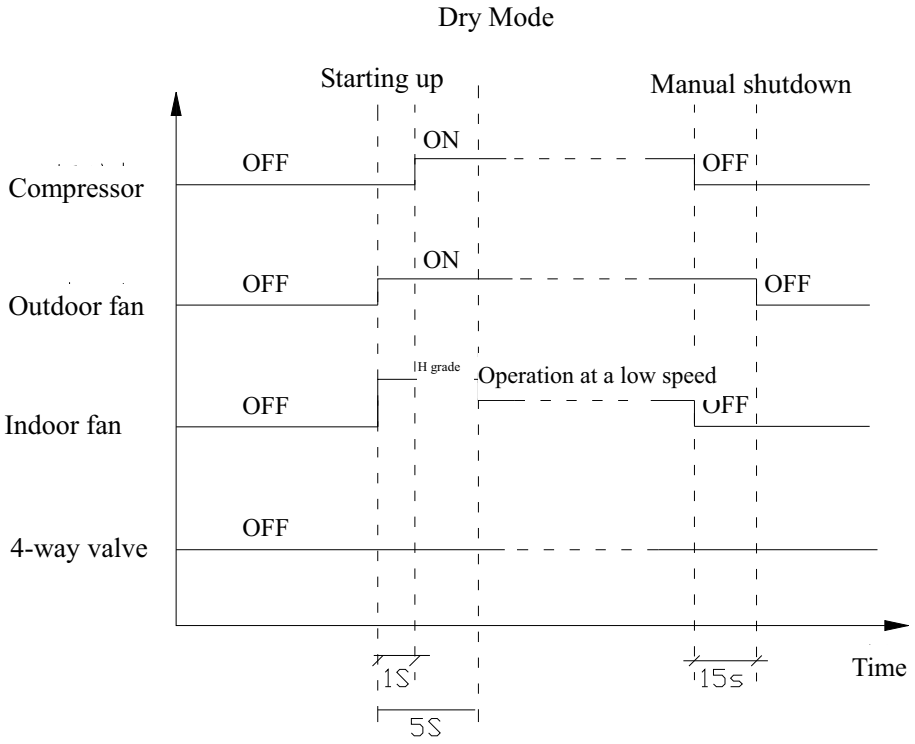


When $T_{amb.} \geq T_{preset\ t} +1℃$, the unit begins cooling operation and the compressor and the outdoor fan are running; and the indoor fan is running at a set speed.

When $T_{amb.} \leq T_{preset} -1℃$, the unit is in the cooling shutdown state, and the compressor and the outdoor fan stop running; and the indoor fan is running at a set speed.

When $T_{preset} -1℃ < T_{amb.} < T_{preset} +1℃$, the unit keeps in the operation state.

2.2 Dry Mode

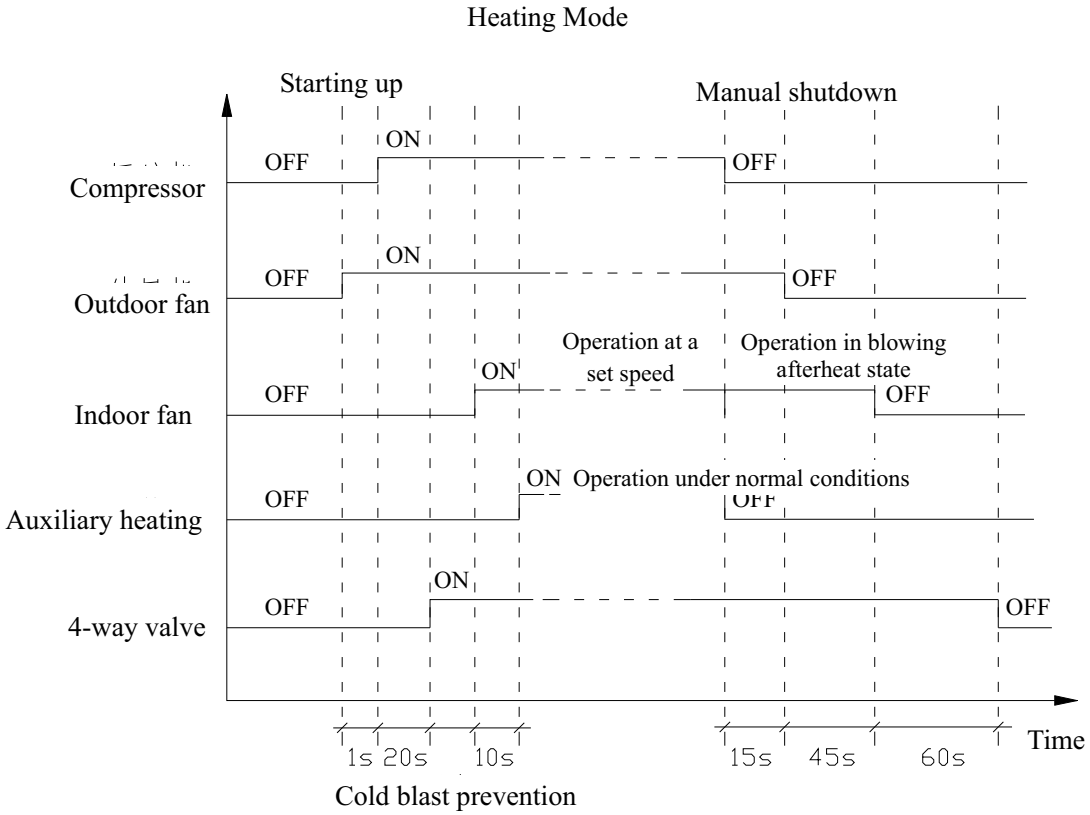


When $T_{amb.} \geq T_{preset}$ +2℃, the unit begins cooling operation and the compressor and the outdoor fan are running; and the indoor fan is running at a low speed.

When $T_{amb.} \leq T_{preset}$ -2℃, the unit is in the cooling shutdown state and the compressor and the outdoor fan stop running.

When T_{prese}-2℃＜$T_{amb.}$＜T_{preset} +2℃, the unit is in the six-minute stop and four-minute operation state, that is, the compressor runs for 6 minutes and then stops for 4 minutes, in such cycle repeatedly; and the indoor fan operates at a low speed.

2.3 Heating Mode

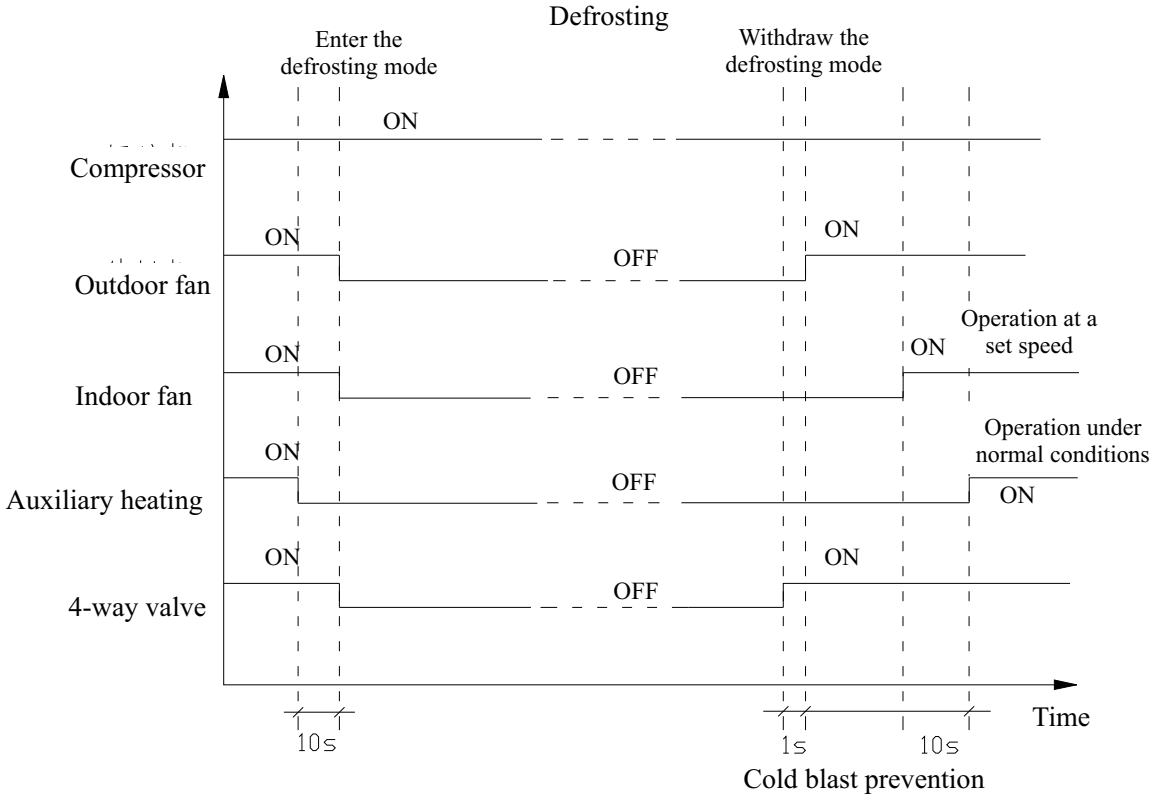


When $T_{amb.} \leq T_{preset}$ -1℃, the unit begins heating operation and the compressor and the outdoor fan are running; and the indoor fan is running at a set speed according to cold fan prevention conditions.

When $T_{amb.} \geq T_{preset}$ +1℃, the compressor and the outdoor fan stop running and the four-way valve keeps energized; and the indoor fan is running according to afterheat blowing conditions.

When $T_{设}$-1℃＜$T_{amb.}$＜T_{preset} +1℃, the unit keeps in the previous operation state.

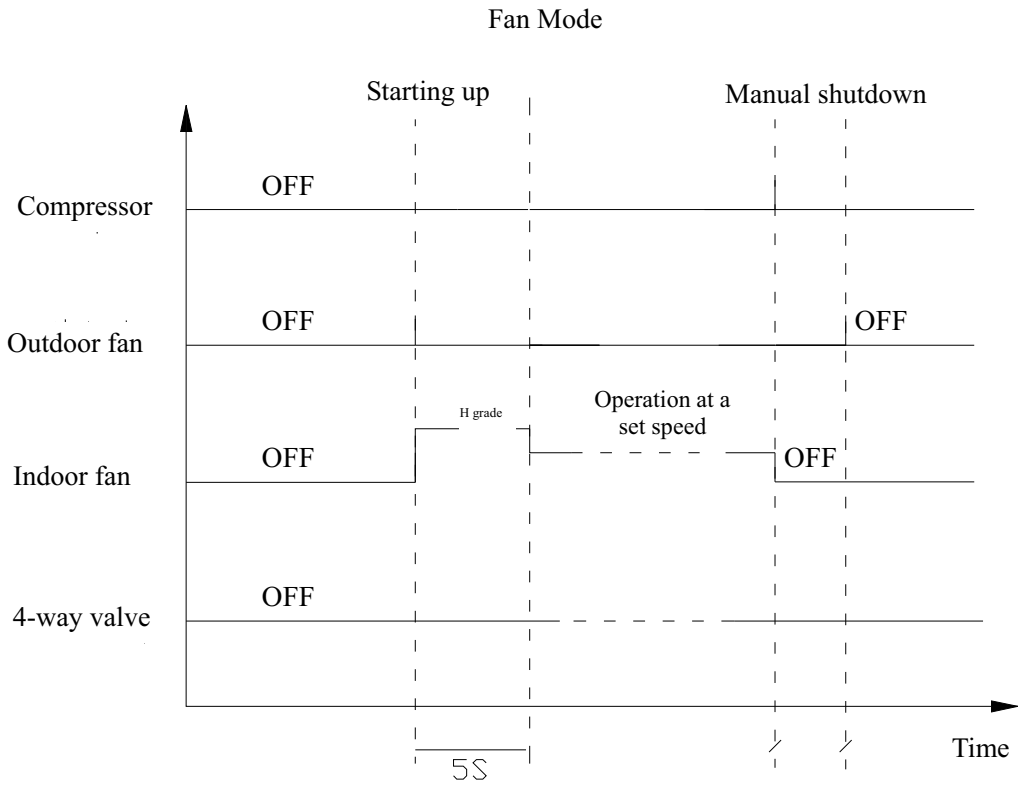
2.4 Defrosting



Defrosting start conditions: after the heating operation runs for an accumulated period of 44 minutes and the compressor continues to operate for 4 hours and 50 seconds, and a one-minute duration of $T_{cond.} \leq -5℃$ is detected, the unit begins defrosting. If an auxiliary heater is available, it must be stopped firstly, and after 10 seconds, the four-way valve, the indoor fan, the outdoor fan and the compressor will run compulsively.

Defrosting completion conditions: when defrosting runs 10 minutes or $T_{cond.} \geq 10℃$, defrosting will be completed. In such case, the four-way valve is running, the outdoor fan is running, the compressor is running compulsively, and the indoor fan operates according to cooling fan proof conditions.

2.5 Fan Mode

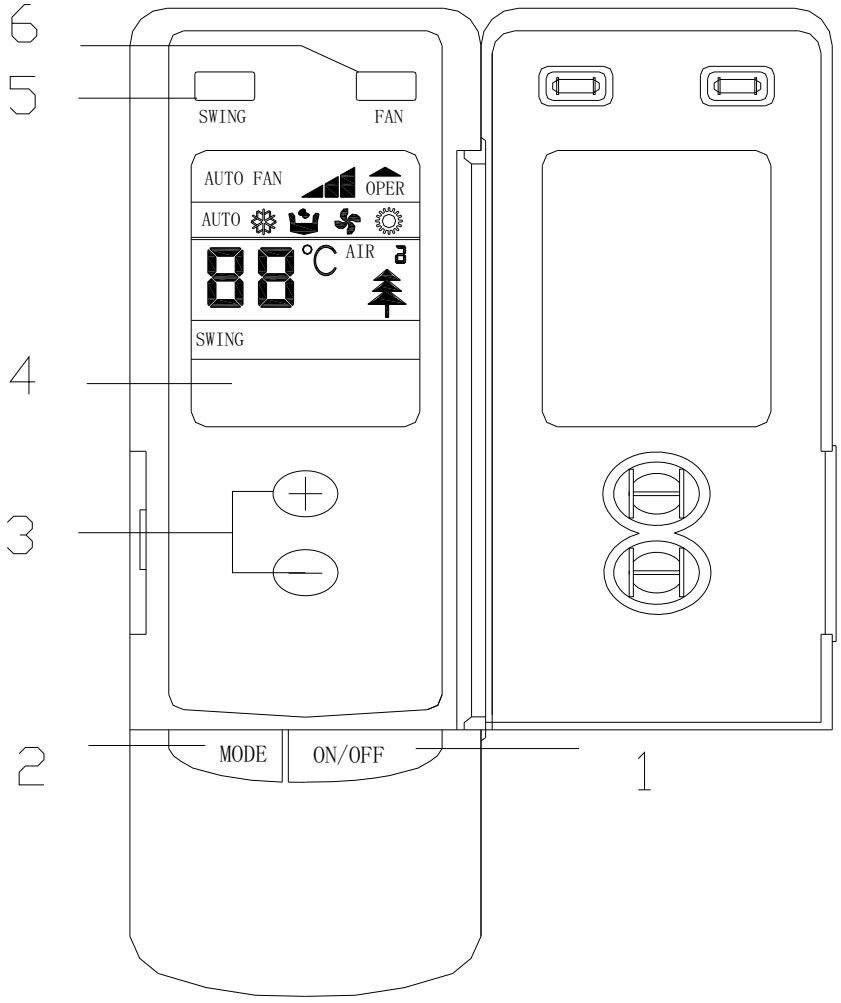


The indoor fan runs at a fast speed for 5s and then runs at a set speed.

3 WIRELESS REMOTE CONTROLLER

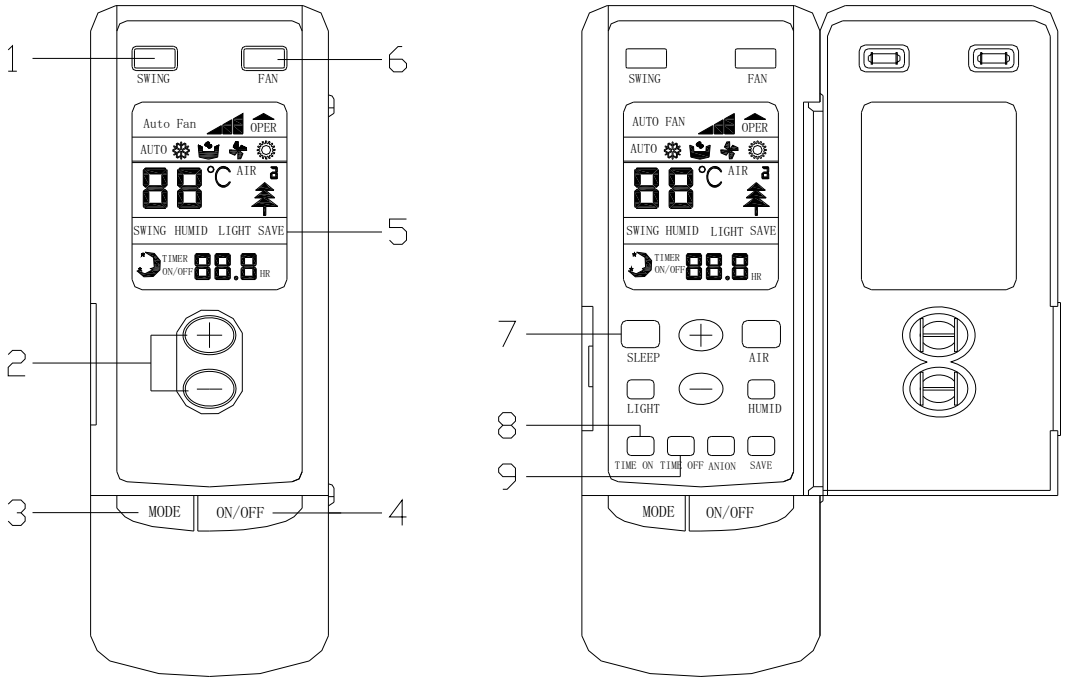
3.1 Operation View

(1) Controller-Duct Type



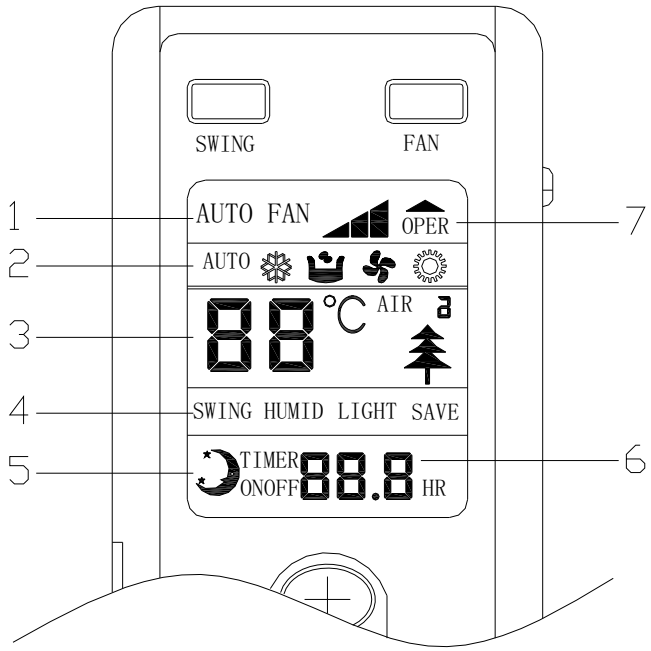
NO.	Name	Function description
1	ON/OFF button	Press the button to set start or close unit
2	Mode button	Press the button to select the mode, cooling , heating , fan or auto mode.
3	Increase/Decrease button	Press this button to increase/decrase the setup temp
4	LCD Screen	Display the status of remote information
5	Swing button	Press this button set swing function
6	Fan speed button	Press this button to set fan speed

(2)Controller-Cassette Type and Ceiling Type



NO.	Name	Function description
1	Swing button	Press this button to set swing function
2	Increase/Decrease button	Press this button to increase/decrase the setup temp
3	Mode button	Press the button to select the mode, cooling , heating , fan or auto mode.
4	ON/OFF button	Press the button to set start or close unit
5	LCD Screen	Display the status of remote information
6	Fan speed button	Press this button to set fan speed
7	Sleep button	Press the button to set sleep function
8	Time on	Press the button to set time on function
9	Time off	Press the button to set time off function

3.2 Display View

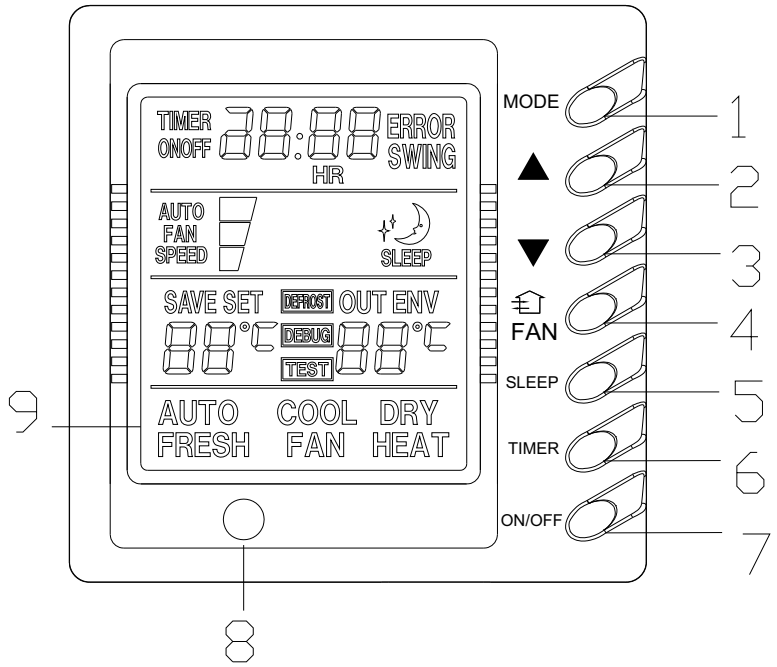


No.	Display	Function description
1	Fan Speed	AUTOFAN: auto fan speed, : low fan speed, : middle fan speed : high fan speed，
2	Run Mode	AUTO: Auto running; : Cool running; : Dry Running; : Fan Running; : Heat running (Heat and Cool unit only)
3	Setup temp	Temperature value of setting
4	Swing function	Swing is on
5	Sleep mode	Sleep mode is on
6	Time value	Timing value of setting
7	OPER	The controller is on

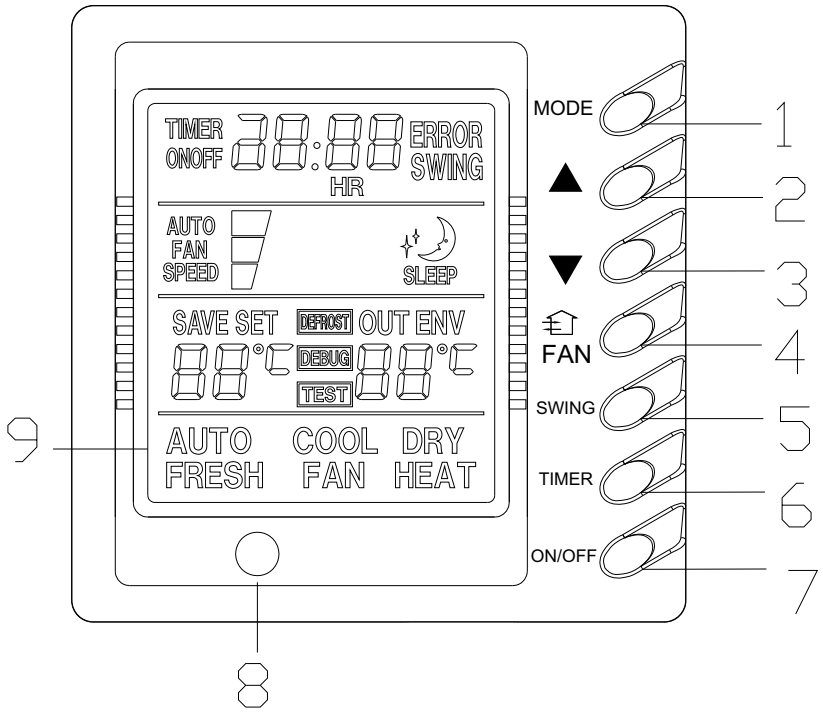
4 WIRED REMOTE CONTROLLER

4.1 Operation View

（1）Wired Controller-Duct Type



（2）Wired Controller-Cassette Type and Ceiling Type



NO.	Name	Function description
1	MODE button	Press the button to select the mode, cooling , heating , fan or auto mode.
2	Increasing button	Press this button to increase the setup temp.
3	Decreasing button	Press this button to decrase the setup temp.
4	Fan speed button	Press this button to set fan speed
5	Sleep/SWING button	Press the button to set sleep/swing function
6	Timer button	Press the button to set timer function
7	On/off button	Press the button to set start or close unit
8	Remote window	Get remote information
9	LCD display	Display unit information

Note：

（1） **SAVE set up ：**At unit turned off, to press the “FAN” +“▼” buttons continuously 5 seconds, it can come enter save set up interphase, the unit will run at save mode.

（2） **FRESH valve setup :** At unit is turned off, press the “ FAN” button for 5seconds,And set up the fresh air setup.

（3） **Outer ambient temperature display:** Under normal condition, “ENV” will display the room ambient temperature, at unit turned on, or unit turned off status, press “SLEEP/SWING” button last for 5 seconds, the LCD will display “OUT ENV”.

（4） **MEMORY function setup:** At unit turned off, press “MODE” button for 10 seconds, could switch whether turn on or off the unit state after powered off.

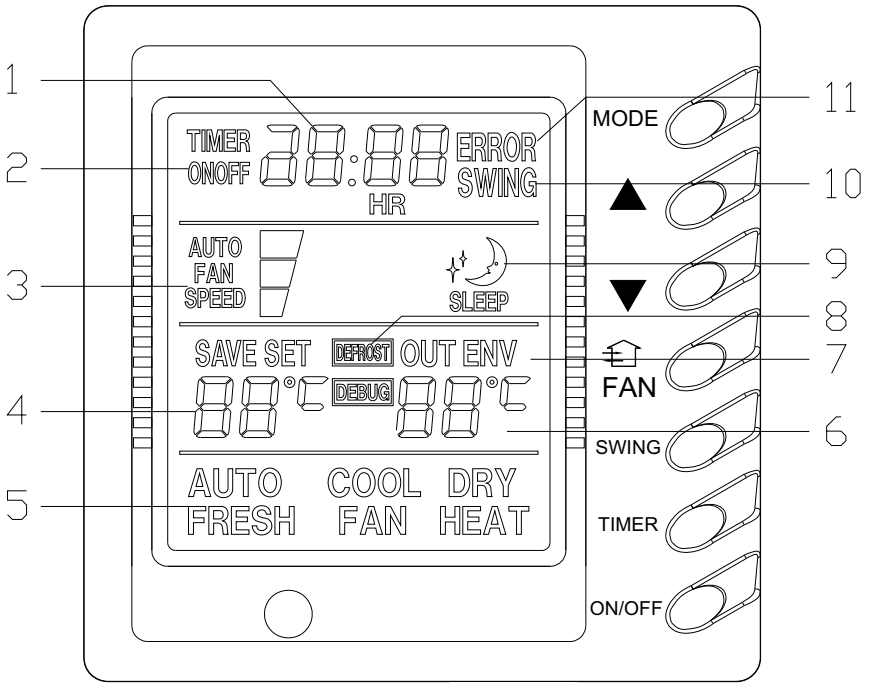
（5） **Debugging function:** At unit off, continuously press “FAN” + “SLEEP” buttons lasting for 10seconds, call out debugging menu, and displays “Debugging” icons, use “MODE” button adjust setting item, by pressing “▲”, “▼” button to set up the detailed value.

(A) Ambient sensor set up: it can set three kinds styles.

（6） **Lock function:** Press “▲”and“▼” at the same time for 5 seconds, the set temp. will display “EE” and shield, all buttons will sound; and repress the“▲”and “▼”at the same time for 5 seconds, the lock function will be released.

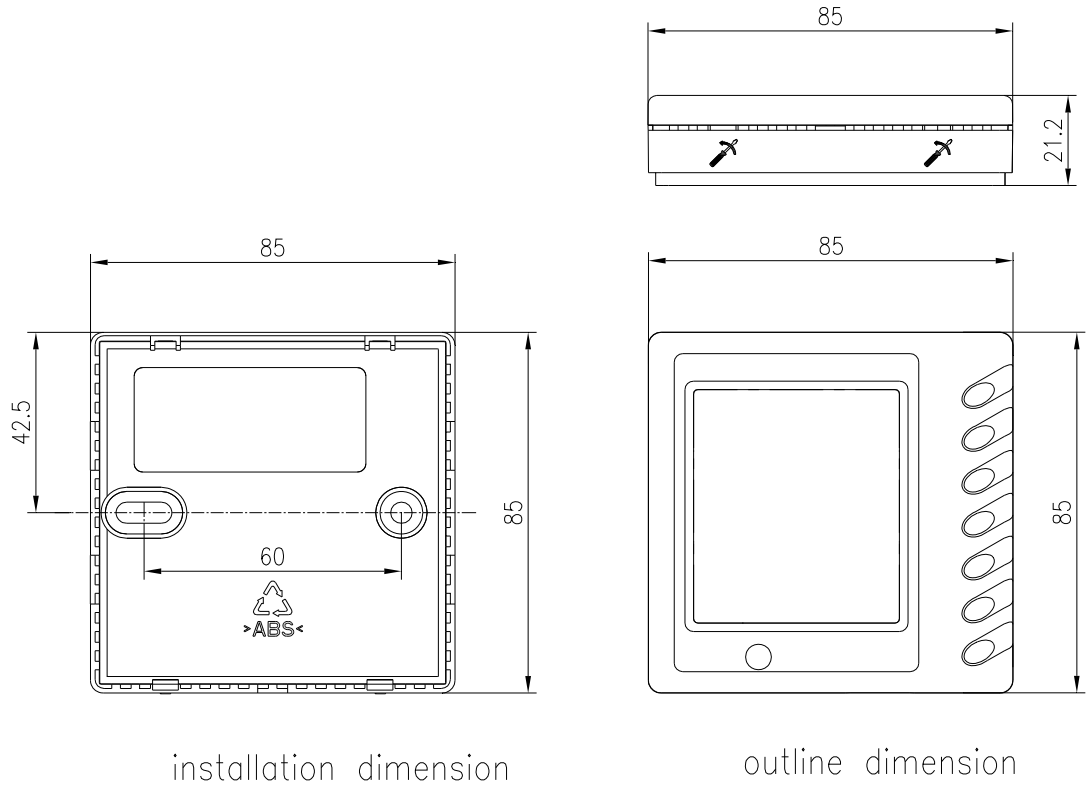
(for details, please read corresponding parts of manual).

4.2 Display View



NO.	Name	Function description
1	Timer value	Display time value
2	Timer on/off	TIMER ON : display timer on, TIMER OFF :display timer off,
3	Fan speed display	AUTO FAN SPEED: auto fan speed, : low fan speed, : middle fan speed, : high fan speed
4	Set temp display	Display set temp value, its range is 16~30 ℃
5	Run mode display	AUTO: auto mode, COOL: cool mode, DRY: dry mode, FRESH: fresh fan mode, FAN: fan mode, HEAT: heat mode(only cool and heat unit)
6	Indoor temp display	Display surrounding temp indoor
7	Outdoor temp display	Display surrounding temp outdoor
8	Frost display	When unit frosts ,it display
9	Sleep display	Display sleep at Sleep mode
10	Swing display	When setting swing function, it displays,
11	Error display	When unit error, error code display

4.3 Dimension



4.4 Installation

1. First select an installation position. According to the size of the communication line of the wire controller, leave a recess or a embedded wire hole to bury the communication line.
2. If the communication line between the wire controller (85×85×20) and the indoor unit is surface-mounted, use 1# PVC pipe and make matching recess in the wall (refer to Figure 6); If concealed installation is adopted, 1# PVC pipe can be used (Refer to Figure 7).
3. No matter if surface mounting or concealed mounting is selected, it is required to drill 2 holes (in the same level) which distance shall be the same as the distance (60mm) of installation holes in the bottom plate of the wire controller. Then insert a wood plug into each hole. Fix the bottom plate of the wire controller to the wall by using the two holes. Plug the communication line onto the control panel. Lastly install the panel of the wire controller.

Caution:

During the installation of the bottom plate of the wire controller, pay attention to the direction of the bottom plate. The plate's side with two notches must be at the lower position, and otherwise the panel of the wire controller cannot be correctly installed.

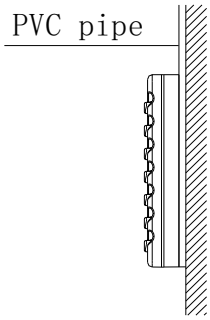


Fig6：Surface Mounting of Cable

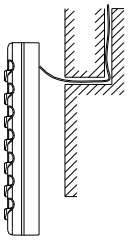


Fig7：Concealed mounting of Cable

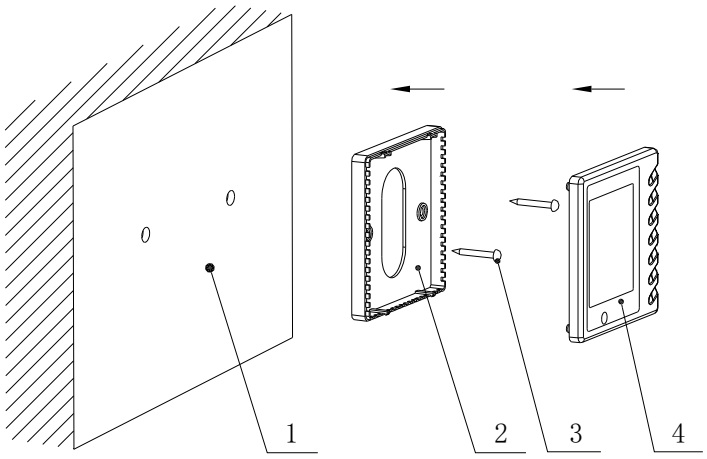


Fig 8 Schematic Diagram of Installation

No.	Name
1	Wall Surface
2	Bottom Plate of Wire Controller
3	Screw M4X10
4	Panel of Wire Controller

⚠ Caution:

1. The communication distance between the main board and the wire controller can be as far as 20m (The standard distance is 8m).
2. The wire controller shall not be installed in a place where there is water drop or large amount of water vapor.

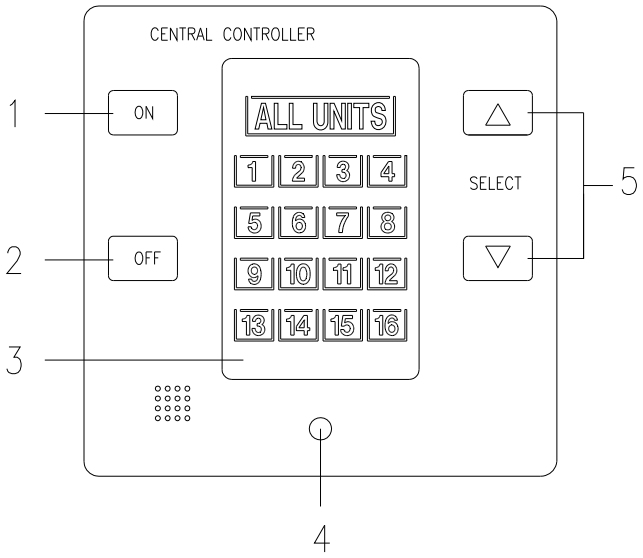
5 CENTRALIZED CONTROLLER

5.1 Centralized Controller-not with week timer

5.1.1 Function

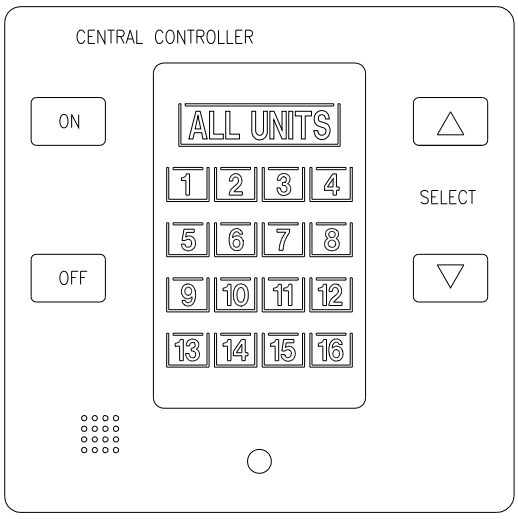
Centralized Controller-not with week timer only control on-off function of every units. Up to 16 sets of units can be controlled simultaneously by the centralized controller-not with week timer.

5.1.2 Operation View



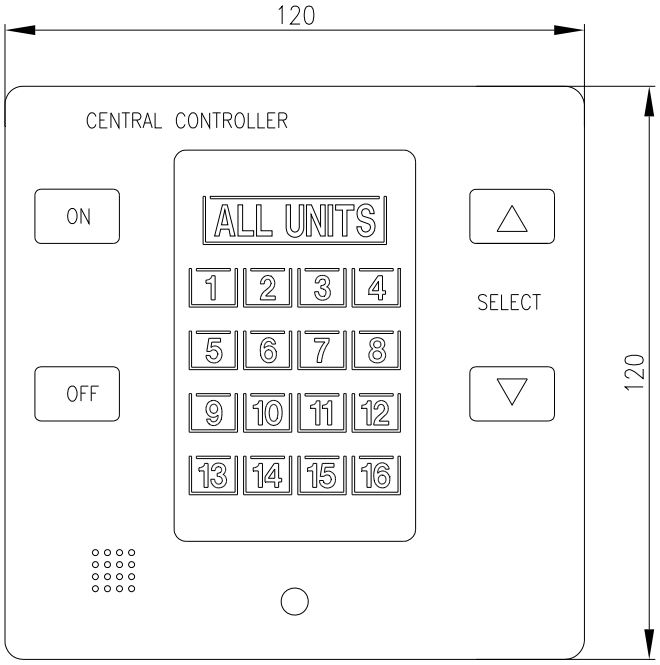
NO.	Name	Function description
1	ON button	Press the button to set start unit
2	OFF button	Press the button to set close unit
3	LCD display	Display unit information
4	LED	LED indication
5	Increasing / Decreasing button	Press buttons select the unit

5.1.3 Display View



Display unit address value in the net.

5.1.4 Dimensions

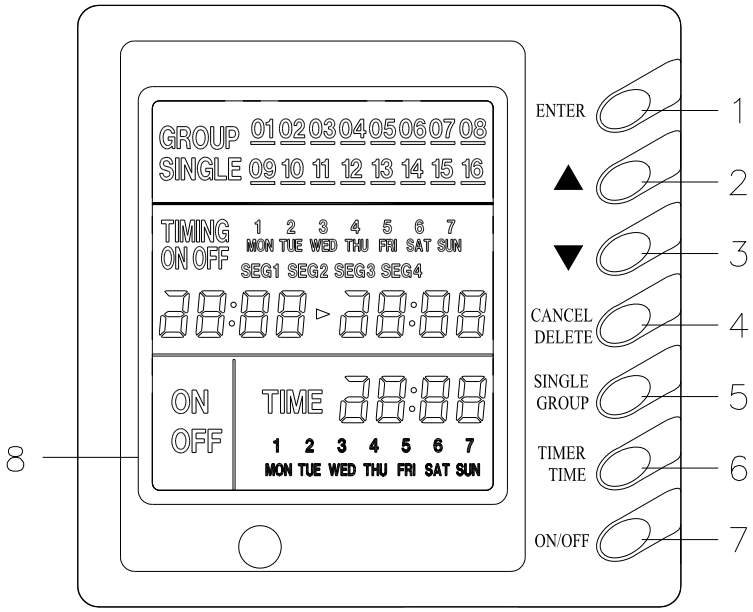


5.2 Centralized Controller-week timer

5.2.1 Function

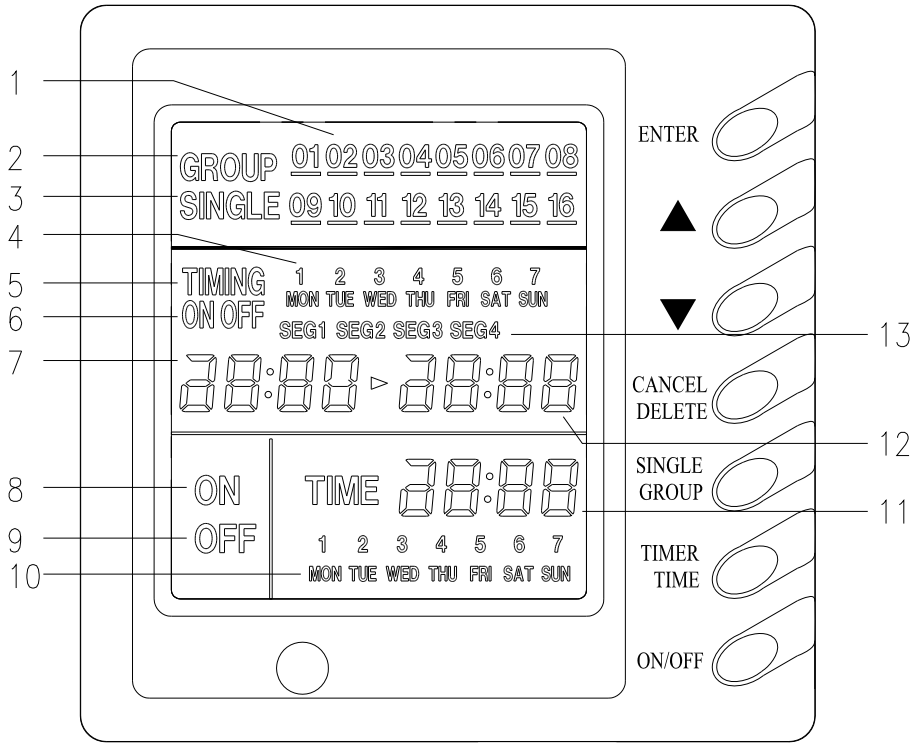
Centralized Control and Week Timer Functions: The centralized controller and the weekly timer are integrated in the same wire controller. The system has both the centralized control and the week timing functions. Up to 16 sets of units can be controlled simultaneously by the centralized controller (weekly timer). The weekly timer has the function of invalidating the lower unit. The weekly timing function is able to realized four timing ON/OFF periods for any unit every day, so as to achieve fully automatic operation. No timing control can be set for holidays. On and off of every duct type unit can be done through the Timer On / Off of this WEEKLY TIMER， it can not set other functions except on-off function of units.

5.2.2 Operation View



NO.	Name	Function description
1	ENTER button	when "**enter**" is pressed the setting is validate.
2	Increasing button	Press "▲" and selected the unit or a certain day in one week or specific value. Press "▲" can set week part of time.
3	Decreasing button	Press "▼" and selected the unit or a certain day in one week or specific value. Press "▼" can set week part of time.
4	CANCEL/DELETE button	short-press "**cancel/delete**" to back to default page or last process, long-press "**cancel/delete**" to cancel timer of a certain time period in a certain day
5	SINGLLE/GROUP button	short-press "**single/group**" to enter single control setting. "**SINGLE**" displayed. long-press "**single/group**" to enter group control setting. "**GROUP**" displayed
6	TIMER/TIME button	Short-press "**timer/time**" to enter timer setting. Long-press "**timer/time**" under default page can begin time setting.
7	On/off button	Control unit run or stop
8	LCD display	Display unit information

5.2.3 Display View

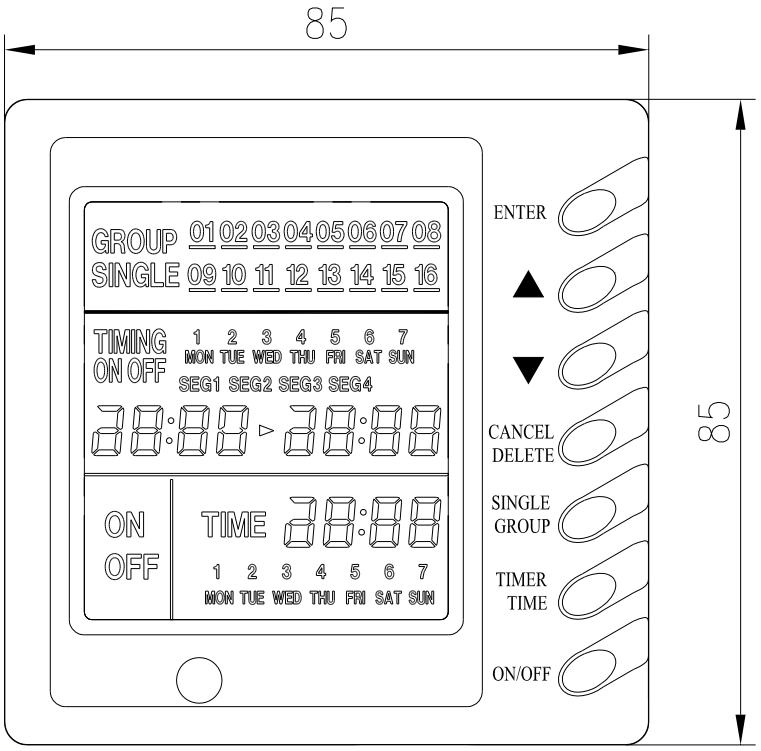


NO.	Name	Function description
1	unit's no. displays	Display unit's numbers
2	Group control displays	when group controls, it will display
3	Single control displays	when single unit controls, it will display
4	Timer time in week displays	Display time in week
5	Timer displays	Display time
6	timer state displays	"on": when set unit on, "on" will display; "off": when set unit off, "off" will display;
7	timer on time displays	Display starts time
8	on control displays	When set unit or group on, it will display,
9	off control displays	When set unit or group off, it will display,
10	present time in week display	Display present time of week.
11	present time in Hr:Min displays	Display time of hour and minute now
12	timer off time displays	Display over time
13	timer period displays	Set to different time segment

Note

Please read corresponding manual of weekly timer controller to be familiar with it.

5.2.4 Dimensions



5.3 Field Setting

The centralized controller displays code of various units: unit code is determined by the position (on the back of the manual operator) of the toggle switch of the manual operator on each flue pipe air conditioner. Toggling values are corresponding to the 4-1 feet from the right to left of the toggle switch. “ON” stands for “0”, and conversely, “OFF” stands for “1”

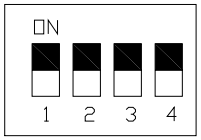
Example 1: to get “0111”, which represents the serial number “8”, you can put foot 1, 2 and 3 of the toggle switch to the opposite of “ON” and foot 4 to “ON”.

Example 2: to get “1010”, which represents the serial number “11”, you can put foot 2 and 4 of the toggle switch to the opposite of “ON” and foot 1 and 3 to “ON”.

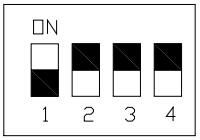
Position	Serial No.	Position	Serial No.	Position	Serial No.	Position	Serial No.
0000	1	0100	5	1000	9	1100	13
0001	2	0101	6	1001	10	1101	14
0010	3	0110	7	1010	11	1110	15
0011	4	0111	8	1011	12	1111	16

As shown in the following diagram:

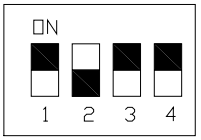
Unit code:1
0000



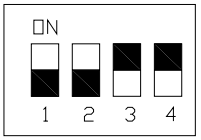
Unit code:2
0001



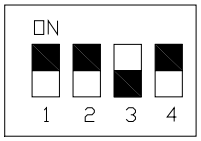
Unit code:3
0010



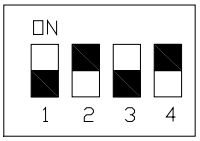
Unit code:4
0011



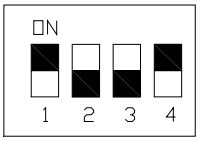
Unit code:5
0100



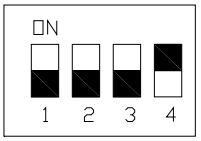
Unit code:6
0101



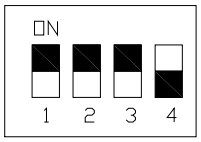
Unit code:7
0110



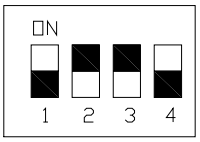
Unit code:8
0111



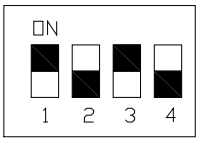
Unit code:9
1000



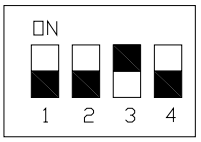
Unit code:10
1001



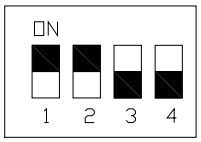
Unit code:11
1010



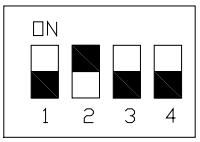
Unit code:12
1011



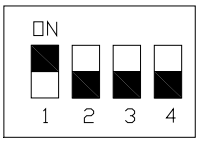
Unit code:13
1100



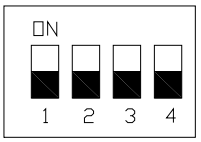
Unit code:14
1101



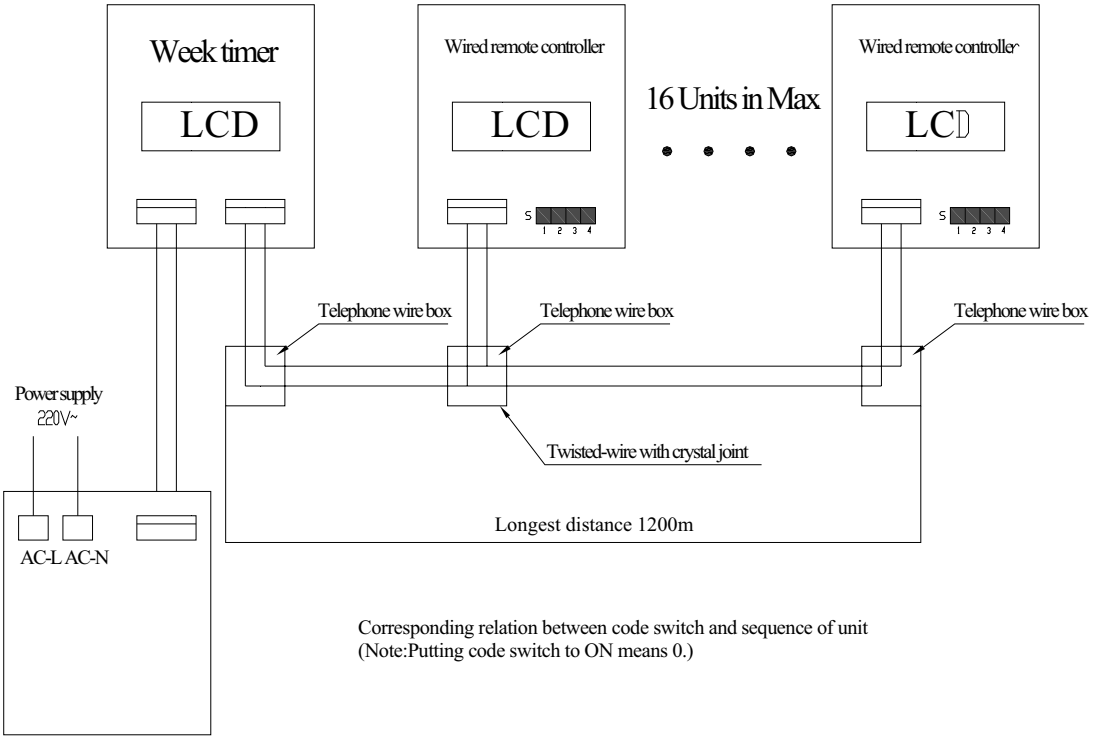
Unit code:15
1110



Unit code:16
1111



5.4 Control Wiring Design



Corresponding relation between code switch and sequence of unit
(Note:Putting code switch to ON means 0.)

P	S	P	S	P	S	P	S
0000	1	0010	5	0001	9	0011	13
1000	2	1010	6	1001	10	1011	14
0100	3	0110	7	0101	11	0111	15
1100	4	1110	8	1101	12	1111	16

INSTALLATION

INSTALLATION

1 INDOOR UNIT INSTALLATION

1.1 Installation of Duct Type

1.1.1 Before Installation

- When the unit arrives, please check if any damage due to transport is existent. If any hurt is found on the surface or inside, please declare to the transport company or the manufacturer in writing.
- Upon receipt of the unit, the unit and accessories shall be checked in accordance with the packing list. Before acceptance, it must be confirmed that the model is correct and the unit is in good shape and specification and quantity of accessories are right.
- Correct handling route and method shall be decided to prevent damage to the unit. For protecting the unit and ensuring its safety, carrying the unit with its package is recommended. If such carrying method is difficult under particular conditions, the canton shall not be removed to avoid looseness or falling during handling
- Confirm the foundation is secure. When the unit is installed on the metal part of a building, electrical insulation must be in compliance with relevant standards.
- Confirm the installation position is away from storage zone of inflammable and explosive substances, or otherwise leakage of inflammable and explosive substances may lead to explosion or a fire.

1.1.2 Installation Site

- Ensure the top hanging piece has strong strength to withstand the weight of the unit.
- The drainage pipe has convenient flow of water.
- There is no obstacle blocking the air intake and exhaust outlet, so as to ensure sound air circulation.
- The installation spaces required by the drawing must be ensured, so as to provide enough space for the service and maintenance.
- The installation site must be far away from heat source, leakage of inflammable gas or smoke.
- The indoor unit is of ceiling mount (indoor unit is hidden inside the ceiling).
- The indoor and outdoor units, the power cable and the connecting electrical lines must be at least 1 meter from any TV set or radio. This is to avoid image interference or noise of the TV set or radio. (Even if the distance is 1 meter, noise can also exist if there is strong electric wave.)

1.1.3 Caution for Installation

1） Ceiling installation mode is applicable to units indoors. The suspender on the ceiling must have sufficient intensity to bear the weight of the unit.

2） Rubber cushion pads (thickness ≥20mm) and flexible rubber connectors must be used in the installation of units to meet noise and vibration prevention requirements.

3） Insert a M10 expansion bolt into the hole. Drive a nail into the bolt. Refer to the profile dimensions drawing of the indoor unit for the distance between the holes. Refer to Figure 1 for the installation of the expansion bolt，as Figure 1-1-1 shows.

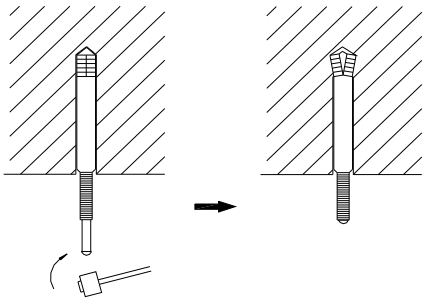


Figure 1-1-1

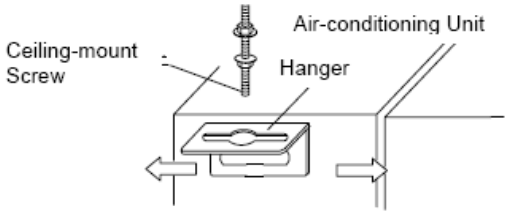


Figure 1-1-2

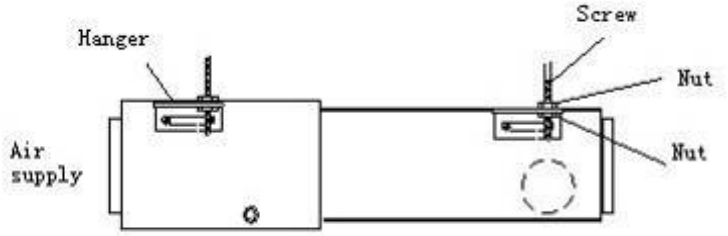


Figure 1-1-3

4） Install the hanger onto the indoor unit as Figure 1-1-2 and Figure 1-1-3 shows.

5） Install the indoor unit at the ceiling as Figure 1-1-5shows.

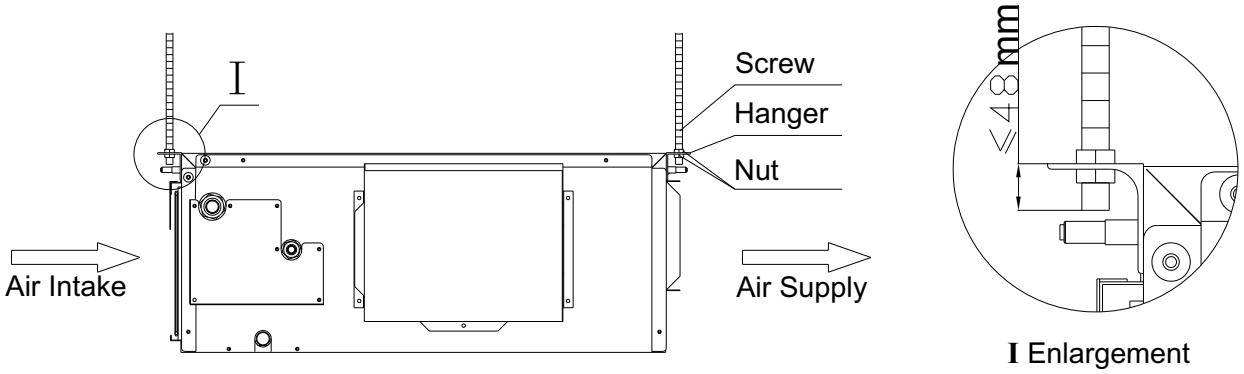


Figure 1-1-5

6） Precautions for unfavorable installation:

- The preparation of all pipes (connecting pipes and drainage pipes) and cables (connecting lines of wire controller, indoor unit and outdoor unit) must be ready before the installation, so as to achieve smooth installation.
- Drill an opening on the ceiling. Maybe it is required to support the ceiling to ensure the evenness of it and avoid the vibration of it. Consult with the user or a construction company for details.
- In case the strength of ceiling is not enough, use angle iron sections to set up a beam support. Place the unit at the beam and fix it.

7） Level detection of indoor unit

After installation of indoor unit, level detection for the complete unit must be done to ensure levelness, as shown in Fig. 1-1-6.

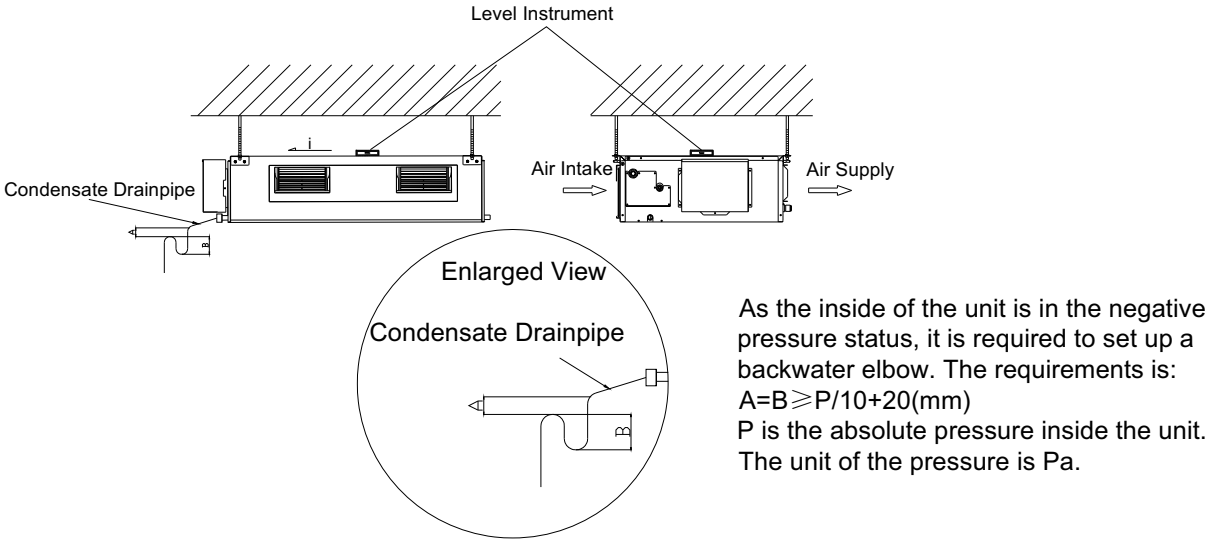

Level Instrument
Air Intake
Air Supply
Condensate Drainpipe
Enlarged View
Condensate Drainpipe
As the inside of the unit is in the negative pressure status, it is required to set up a backwater elbow. The requirements is:
A=B≥P/10+20(mm)
P is the absolute pressure inside the unit.
The unit of the pressure is Pa.

Figure 1-1-6

1.1.4 Dimension Data

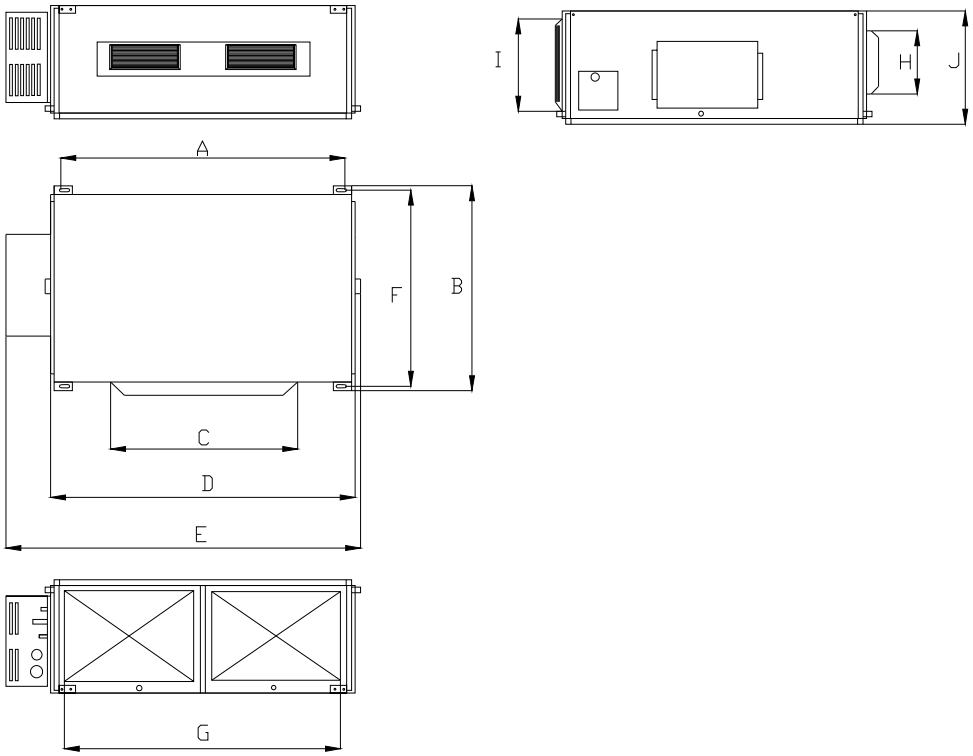


Figure 1-1-7

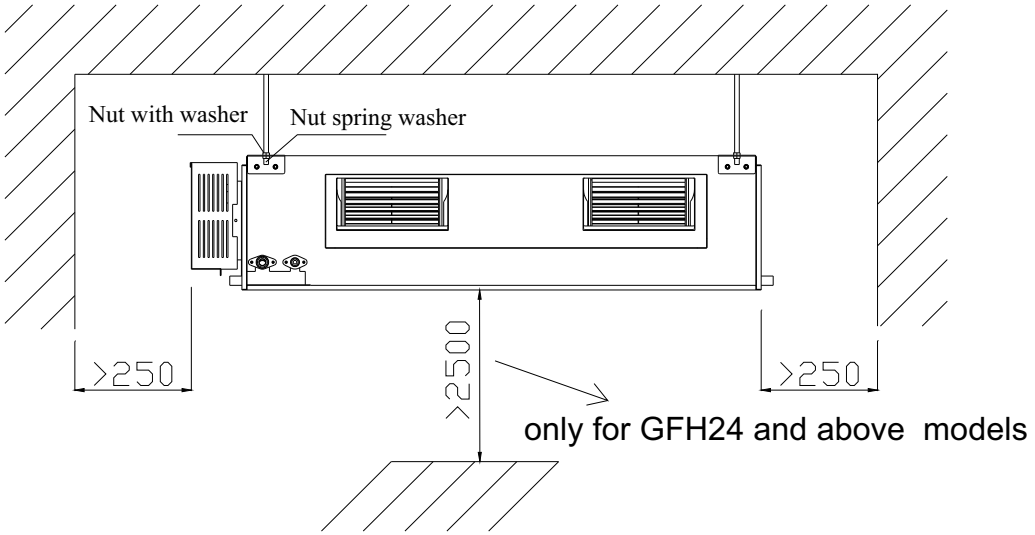
Unit：mm

Model	A	B	C	D	E	F	G	H	I	J
IDI-09	856	571	515	790	913	680	750	100	172	220
IDI-12										
IDI-18	932	627	738	894	1012	736	738	125	207	266
IDI-24	1101	395	820	1159	1207	504	1002	160	235	265
IDI-36	1011	635	820	1115	1251	744	980	160	231	290
IDI-45										
IDI-50										
IDI-60	1015	679	820	1115	1251	788	980	160	261	330

List of Accessories for Installation of Indoor Unit

Designation and shape	**Qty**	**Description**
Operation and installation instructions	1	
Heat insulating material for large connector	1	For air pipe connector of indoor unit
Heat insulating material for small connector	1	For refrigerant pipe connector of indoor unit
Heat insulation material for drain pipe	2	For packing condensate pipe and rubber plug
Nut with washer M8	8	For fixing the hanging hook
Nut with washer M10	4	Four sets, for hoisting the unit on the ceiling
Nut and spring washer	4	
Hanging hook	4	For hoisting the unit on the ceiling
Wire binding tie	4or 8	4 for a two-horsepower unit, 8 for other unit.
Wire controller	1	
Remote controller	1	
Battery	2	
Bellow	0，2 or 4	0 for a 2-powerhorse unit, 2 for a 2.5－3 horsepower unit，4 for a 4－5 horsepower unit.
Power cable	1－2	2 for a 4－5 horsepower unit and 1 for other unit.
Connecting cable	2－3	3 for a 4－5 horsepower unit and 2 for other unit.

1.1.5 Installation Clearance Data



Indoor Unit Figure 1-1-8

1.1.6 Drain Piping Work

1） Installation of Drainage Pipeline

- A drainage outlet is located at both the left and right sides of the indoor unit. After selecting one drainage outlet, the other outlet shall be blocked by rubber plug. Bundle the blocked outlet with string to avoid l1eakage, and also use thermal insulation materials to wrap the blocked outlet.
- When shipped out from factory, both the Drainage outlets are blocked by rubber plugs.
- When connecting the drainage pipe with the unit, do not apply excessive force to the pipeline at the side of the unit. The fixing position of the pipeline shall be near the unit.
- Purchase general-purpose hard PVC pipe locally to be used as the drainage pipeline. When carrying out connection, place the end of the PVC pipeline into the drainage hole. Use flexible drainage tube and tighten it with thread loop. Never use adhesive to connect the drainage hole and the flexible drainage tube. (As shown in Figure 1-1-9)
- When the laid drainage pipe is used for multiple units, the common pipe shall be about 100mm lower than the drainage outlet of each set of unit. A pipe with thicker wall shall be used for such purpose.

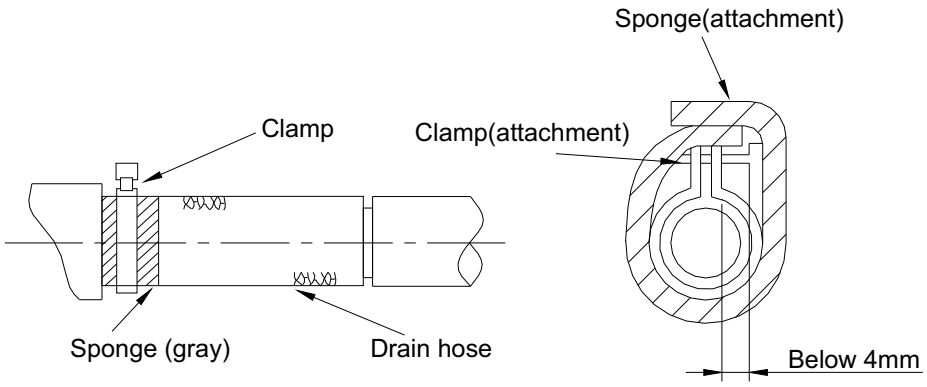


Figure 1-1-9

2） Testing of Drainage System

- After the electrical installation is completed, carry out the testing of the drainage system.
- During the test, check if the water correctly flows through the pipelines. Carefully observe the joints to ensure that there is no leakage. If the unit is to be installed in a new house, carry out testing before decorating the ceiling.

3） Matters of Attention

- The joint of Drainage Pipeline must not have leakage.
- The Drainage Pipeline shall be installed with an inclining angel of 5～10°, so as to facilitate the drainage of condensate. The joints of the Drainage Pipeline must be covered by thermal insulation materials to avoid generation of exterior condensate. (As shown in Figure 1-1-10)

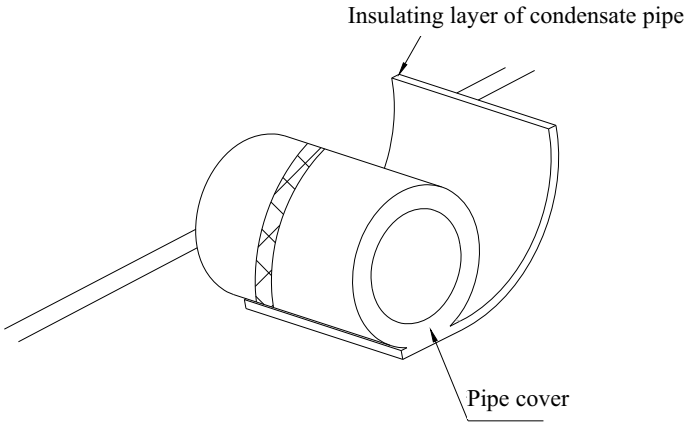


Figure 1-1-10

1.1.7 Installation of air pipes and openings

Caution:

- The air supply pipe, the air intake pipe and the fresh air pipe must be covered with a layer of thermal insulation, so as to avoid thermal leakage and condensation. Firstly apply liquid nail on the pipes, then attach the thermal insulation cotton with a layer of tinfoil. Use the liquid nail cover to fix it. Lastly use tinfoil adhesive tape to carefully seal the joints; other good thermal insulation materials can also be used.
- The air supply pipes and the air intake pipes shall be fixed to the prefabricated boards of the ceiling by using

iron supports. The joints of the pipes must be sealed by glue so as to avoid leakage.

- The design and installation of air pipes must be in conformity with the relevant state engineering criteria.
- The edge of the air intake pipe must be at least 150mm away from the wall. The air intake must be covered with filter.
- Silencing and shock absorption shall be considered in the design and installation of the air pipes. Additionally, the noise source must be far away from where people stay. The air intake shall not be located above the place where users stay (offices and rest places, etc.).

1） Installation of air supply duct

- Installation of rectangular air duct, as shown in Figure 1-1-11

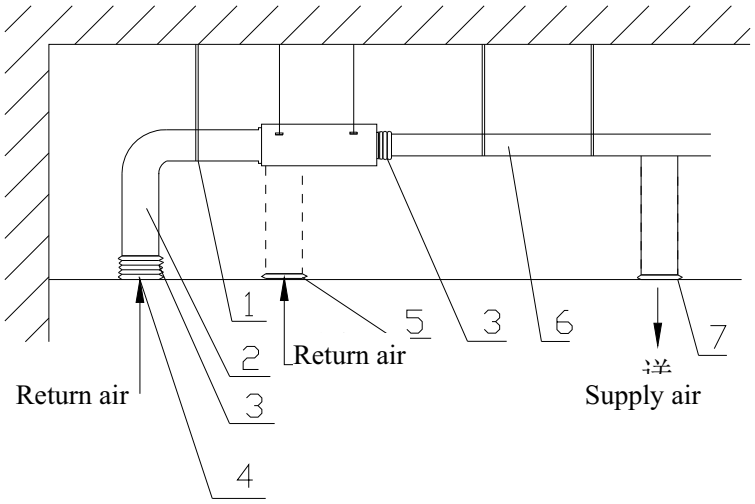


Figure 1-1-11

No.	Designation	No.	Designation
1	Hanger rod	5	Filter screen
2	Return duct	6	Main air supply duct
3	Canvas duct	7	Air outlet
4	Return air inlet		

- Installation of circular duct, as shown in Figure 1-1-12

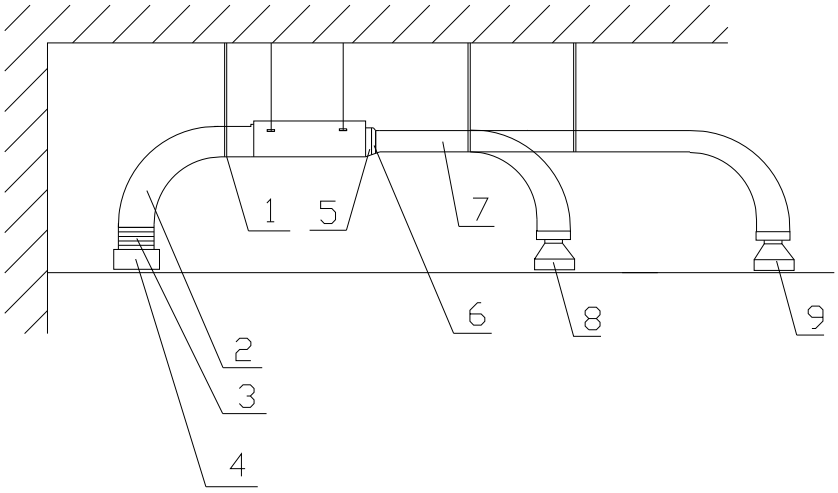


Figure 1-1-12

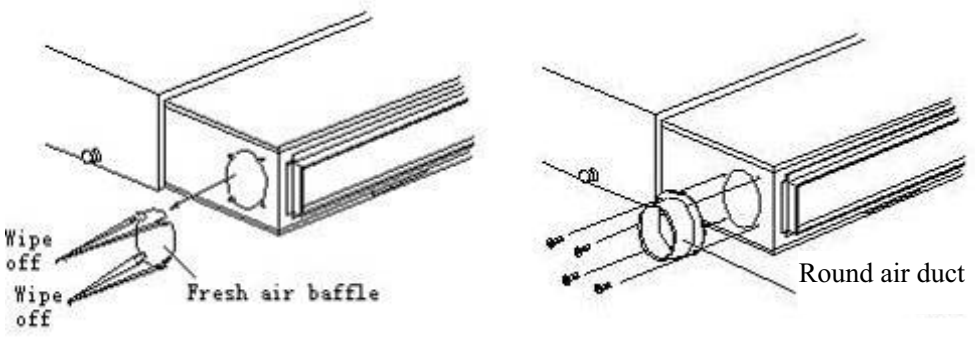
No.	Designation	No.	Designation
1	Hanger rod	6	Transition duct
2	Air return duct	7	Air supply duct
3	Canvas duct	8	Air diffuser
4	Return air shutter	9	Connector of air diffuser
5	Air outlet		

Note:

The above two diagrams show how back return air inlets are installed. Lower return air inlets shall be used according to actual installation demands. The installation method is similar to the back return air inlets. Among all air outlets, at least one keeps open. If circular duct is in use, air shall be supplied to rooms through circular flexible insulating duct. Air supply duct and return duct shall be heat insulated.

2） Installation of fresh air duct (only limited to excessive pressure units with refrigerating output over 6000W)

- The fresh air battle, as shown in Figure 1-1-13(a), must be removed for mounting the fresh air duct. If the fresh air duct is not in use, gaps around the battle shall be sealed by sponge.
- Circular flanges are mounted for convenient connection of the fresh air duct, as shown in Figure 1-1-14(b)
- Ducts and circular flanges must be sealed and insulated sufficiently.
- Fresh air must be filtered air.



(a) (b)

Figure 1-1-13

3） Installation of air return duct

- Square flanges at ex-factory shall be defaulted to installation at the back and the air return cover plate shall be mounted at the lower, as shown in figure 1-1-14.

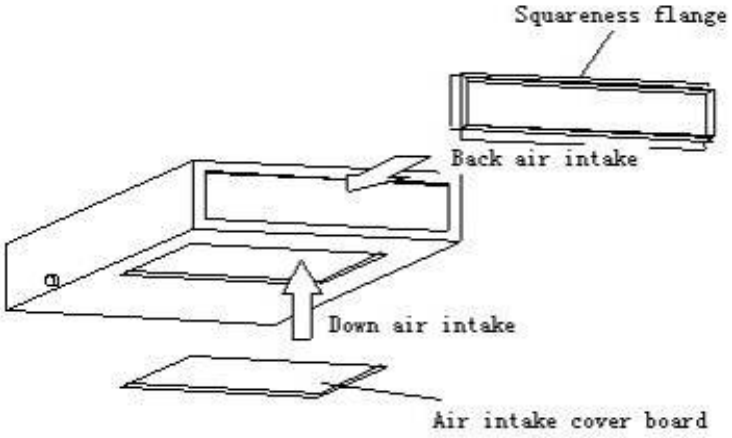
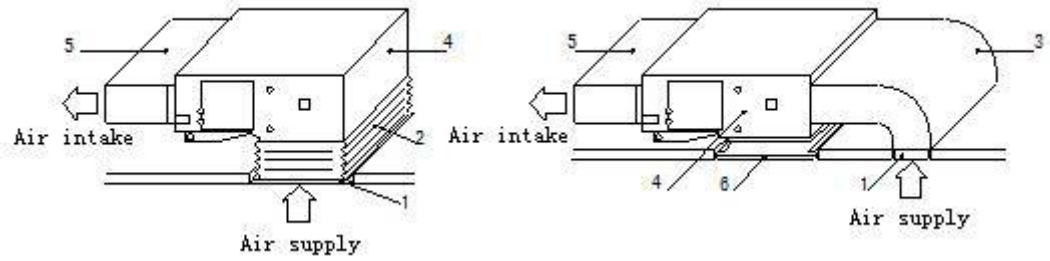


Figure 1-1-14

- If lower air return is demanded, the square flange and the air return cover plate should be exchanged in their respective position.
- The air return duct shall be connected to the air return inlet on the indoor unit with rivets, and the other end of the air return duct is connected to an air return window. To freely adjust the height, a section of canvas duct can be fabricated and reinforced by ８＃ iron wires in the folding shape. A proper installation method shall be selected by taking into overall consideration of building and maintenance conditions.



No.	Designation	No.	Designation
1	Air return window	4	Indoor unit
2	canvas duct	5	Air supply duct
3	Air return duct	6	Check grating

Figure 1-1-15

4） Installation of circular air supply outlet

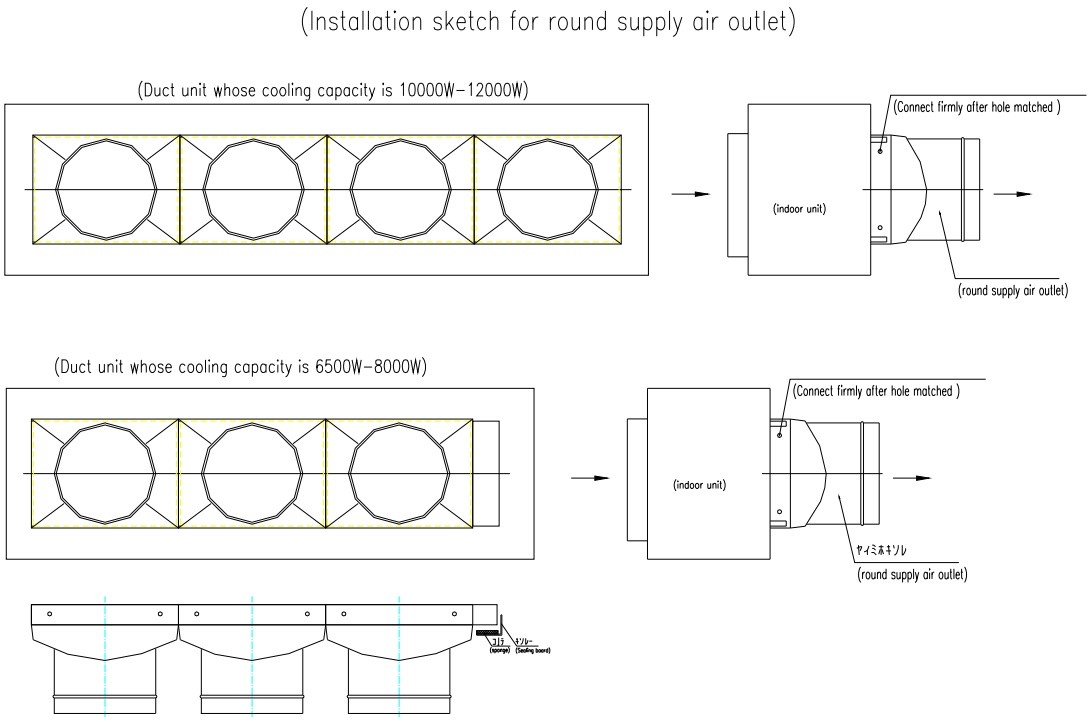

(Installation sketch for round supply air outlet)
(Duct unit whose cooling capacity is 10000W-12000W)
(Connect firmly after hole matched)
(indoor unit)
(round supply air outlet)
(Duct unit whose cooling capacity is 6500W-8000W)
(Connect firmly after hole matched)
(indoor unit)
(round supply air outlet)

Figure 1-1-16

1.2 Installation of Ceiling Type

1.2.1 Before Installation

- When the unit arrives, please check if any damage due to transport is existent. If any hurt is found on the surface or inside, please declare to the transport company or the manufacturer in writing.
- When the unit arrives, please check if any damage due to transport is existent. If any hurt is found on the surface or inside, please declare to the transport company or the manufacturer in writing.
- Correct handling route and method shall be decided to prevent damage to the unit. For protecting the unit and ensuring its safety, carrying the unit with its package is recommended. If such carrying method is difficult under particular conditions, the canton shall not be removed to avoid looseness or falling during handling.
- Confirm the foundation is secure. When the unit is installed on the metal part of a building, electrical insulation must be in compliance with relevant standards.
- Confirm the installation position is away from storage zone of inflammable and explosive substances, or

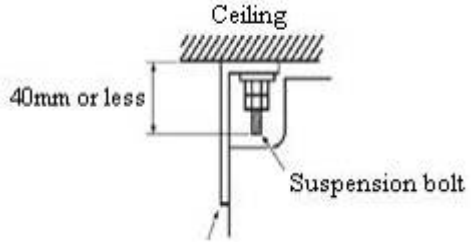
otherwise leakage of inflammable and explosive substances may lead to explosion or a fire.

1.2.2 Installation Site

- Such a place where cool air can be distributed throughout the room.
- Such a place where condensation water is easily drained out.
- Such a place that can handle the weight of indoor unit.
- Such a place which has easy access for maintenance.
- Such a place where is permitting easy connection with the outdoor unit.
- Such a place where is 1m or more away from other electric appliances such as television, audio device, etc.
- Avoid a location where there is heat source, high humidity or inflammable gas.
- Do not use the unit in the immediate surroundings of a laundry, a bath, a shower or a swimming pool.
- Be sure that the installation conforms to the installation dimension diagram.
- The space around the unit is adequate for ventilation

1.2.3 Caution for Installation

- Adjust the distance from the unit to the ceiling slab beforehand (Refer to Figure 1-2-1).
- Fix the hanger bracket to the suspension bolt (Refer to Figure 1-2-2).
- Make sure that extended suspension bolt from the ceiling stays inside the arrowed position. Readjust the hanger bracket when it is outside the arrowed position. (Refer to Figure 1-2-3)
- Suspension bolt stays inside the cap of indoor unit .Never remove the cap. Lift the unit and slide forward unit the dent. (Refer to Figure 1-2-4)
- Screw tightly both hanger bracket setting bolts (M8) (Refer to Figure 1-2-2)
- Screw tightly both hanger bracket fixing bolts (M6) to prevent the movement of the indoor unit. (Refer to Figure 1-2-2)
- Adjust the height by turning the nut with a spanner. Insert the spanner from the hanger bracket opening. (Refer to Figure 1-2-5)



Hanger bracket Figure 1-2-1

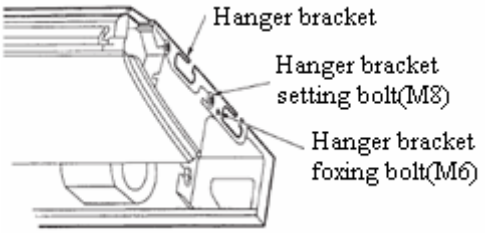
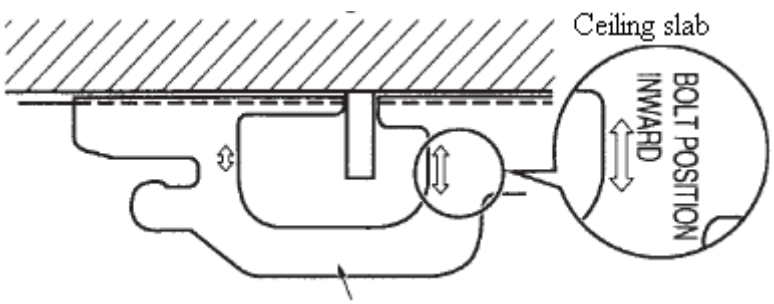


Figure 1-2-2



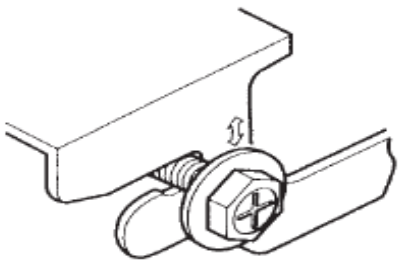
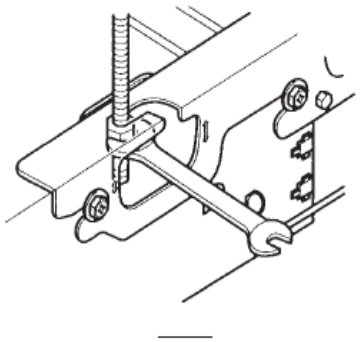


Figure 1-2-3 Hanger bracket Figure 1-2-4

In case of hanging:

It is possible to install using inward facing hanger bracket by not removing the brackets from the indoor unit. (Refer to Figure 1-2-6) Be sure to use only the specified accessories and parts for installation work.



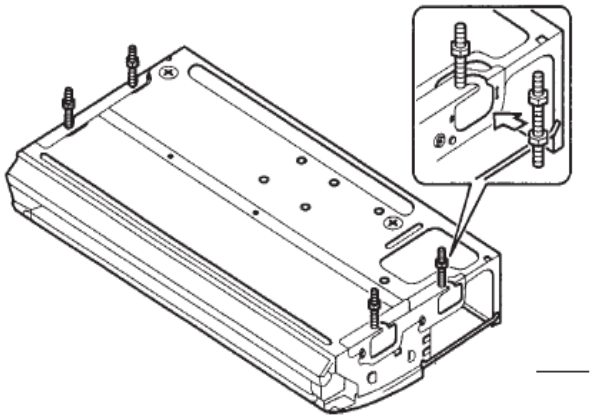


Figure 1-2-5 Figure 1-2-6

1.2.4 Dimension Data

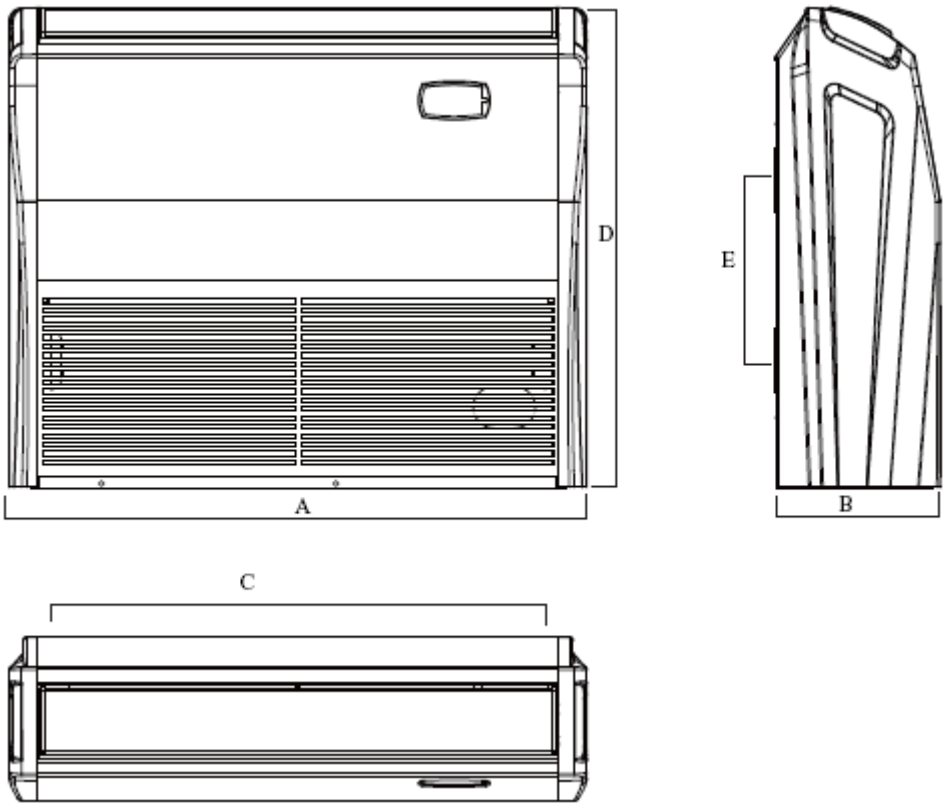


Figure 1-2-7

Unit: mm

Model	A	B	C	D	E
IKI-09	836	238	745	695	260

IKI-12 IKI-18					
IKI-24	1300	188	1202	600	260
IKI-36 IKI-45 IKI-50	1590	238	1491	695	260

1.2.5 Installation Clearance Data

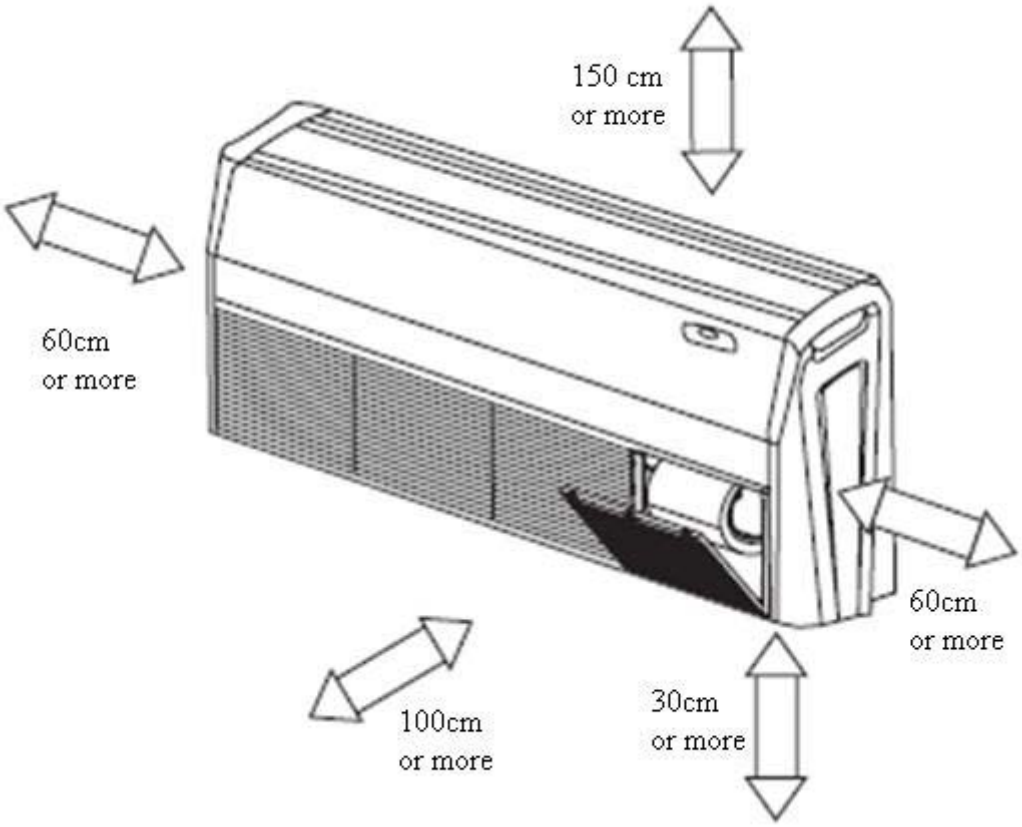


Figure 1-2-8

1.2.6 Drain Piping Work

1） Installation of Drainage Pipeline

- A Drainage outlet is located at both the left and right sides of the indoor unit. After selecting one Drainage outlet, the other outlet shall be blocked by rubber plug. Bundle the blocked outlet with string to avoid leakage, and also use thermal insulation materials to wrap the blocked outlet.
- When shipped out from factory, both the Drainage outlets are blocked by rubber plugs.
- When connecting the drainage pipe with the unit, do not apply excessive force to the pipeline at the side of the unit. The fixing position of the pipeline shall be near the unit.
- Purchase general-purpose hard PVC pipe locally to be used as the drainage pipeline. When carrying out connection, place the end of the PVC pipeline into the drainage hole. Use flexible drainage tube and tighten it with thread loop. Never use adhesive to connect the drainage hole and the flexible drainage tube. (As shown in Figure 1-2-9)

- When the laid drainage pipe is used for multiple units, the common pipe shall be about 100mm lower than the drainage outlet of each set of unit. A pipe with thicker wall shall be used for such purpose.

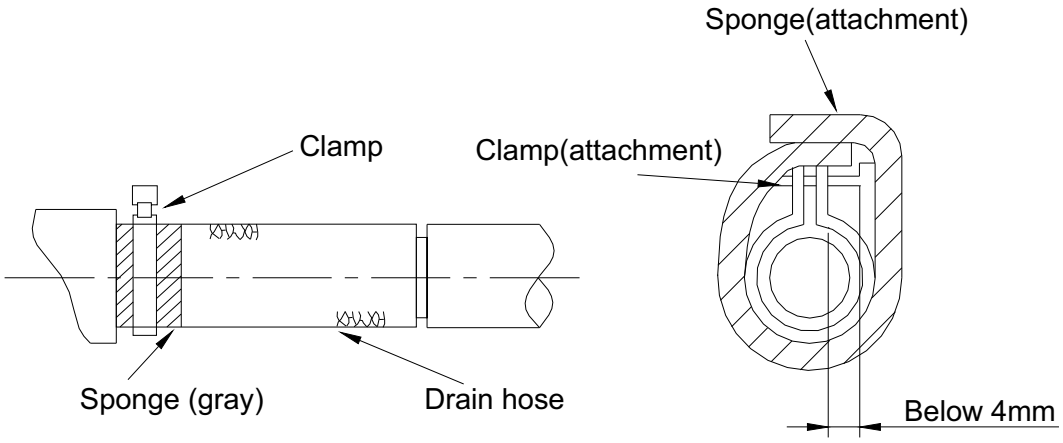


Figure 1-2-9

2） Testing of Drainage System

- After the electrical installation is completed, carry out the testing of the drainage system.
- During the test, check if the water correctly flows through the pipelines. Carefully observe the joints to ensure that there is no leakage. If the unit is to be installed in a new house, carry out testing before decorating the ceiling.

3） Matters of Attention

- The drain pipe outlet direction can be chosen from either the right rear or right.

The diameter of the drain pipe should be equal to or greater than the diameter of the connecting pipe. (Vinyl tube; pipe size: 20mm; outer dimension: 26mm)

Keep the drain pipe short and incline downwards at a gradient of at least 1/100 to prevent air pockets. (Refer to Figure 1-2-10)

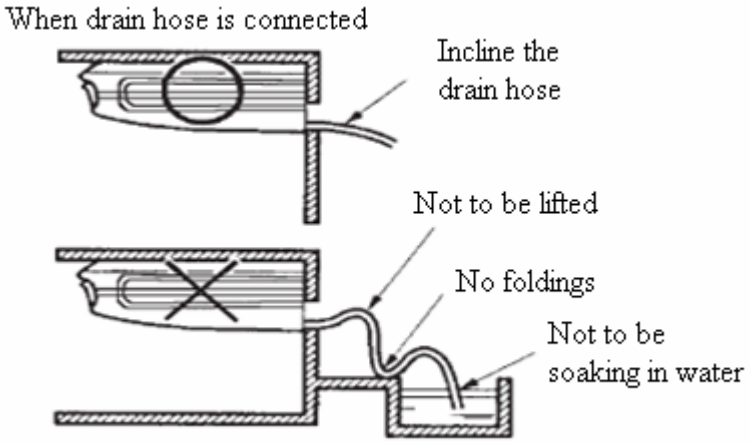


Figure 1-2-10

- No folding of drain hose inside the indoor unit. (Refer to Figure 1-2-11)
- Confirm that smooth drainage is achieved after the piping work. Pour 600 cc of water into the drain pan from

the air outlet for confirming drainage. (Refer to Figure 1-2-12)

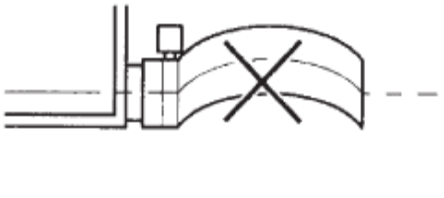


Figure 1-2-11

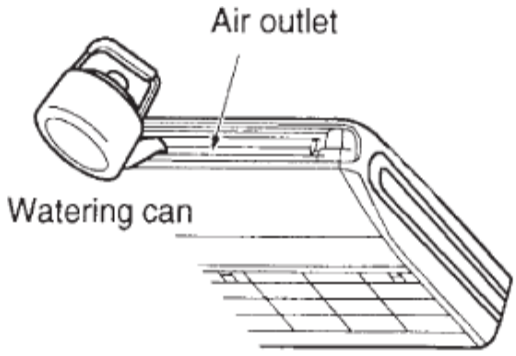


Figure 1-2-12

1.3 Installation of Cassette Type

1.3.1 Before Installation

- When the unit arrives, please check if any damage due to transport is existent. If any hurt is found on the surface or inside, please declare to the transport company or the manufacturer in writing.
- Upon receipt of the unit, the unit and accessories shall be checked in accordance with the packing list. Before acceptance, it must be confirmed that the model is correct and the unit is in good shape and specification and quantity of accessories are right.
- Correct handling route and method shall be decided to prevent damage to the unit. For protecting the unit and ensuring its safety, carrying the unit with its package is recommended. If such carrying method is difficult under particular conditions, the canton shall not be removed to avoid looseness or falling during handling.
- Confirm the foundation is secure. When the unit is installed on the metal part of a building, electrical insulation must be in compliance with relevant standards.
- Confirm the installation position is away from storage zone of inflammable and explosive substances, or otherwise leakage of inflammable and explosive substances may lead to explosion or a fire.

1.3.2 Installation Site

- Obstruct should put away from the intake or outlet vent of the indoor unit so that the airflow can be blown though all the room.
- Make sure that the installation had accord with the requirement of the schematic diagram of installation spaces.
- Select the place where can stand 4 times of the weight of the indoor unit and would not increase the operating noise and oscillate.
- The horizontally of the installation place should be guaranteed.
- Select the place where is easy to drain out the condensate water, and connect with outdoor unit.
- Make sure that there are enough space for care and maintenance. Make sure that the weight between the indoor unit and ground is above 2300mm.
- When installing the steeve bolt, check if the install place can stand the weight 4 times of the unit's. If not, reinforce before installation. (Refer to the install cardboard and find where should be reinforced) The appliance shall not be installed in laundry.

Cautions:

There will be lots of lampblack and dust stick on the acentric, heat exchanger and water pump in dining room and kitchen, which would reduce the capacity of heat exchanger, lead water leakage and abnormal operation of the water pump.

The following treatment should be taken under this circumstance:

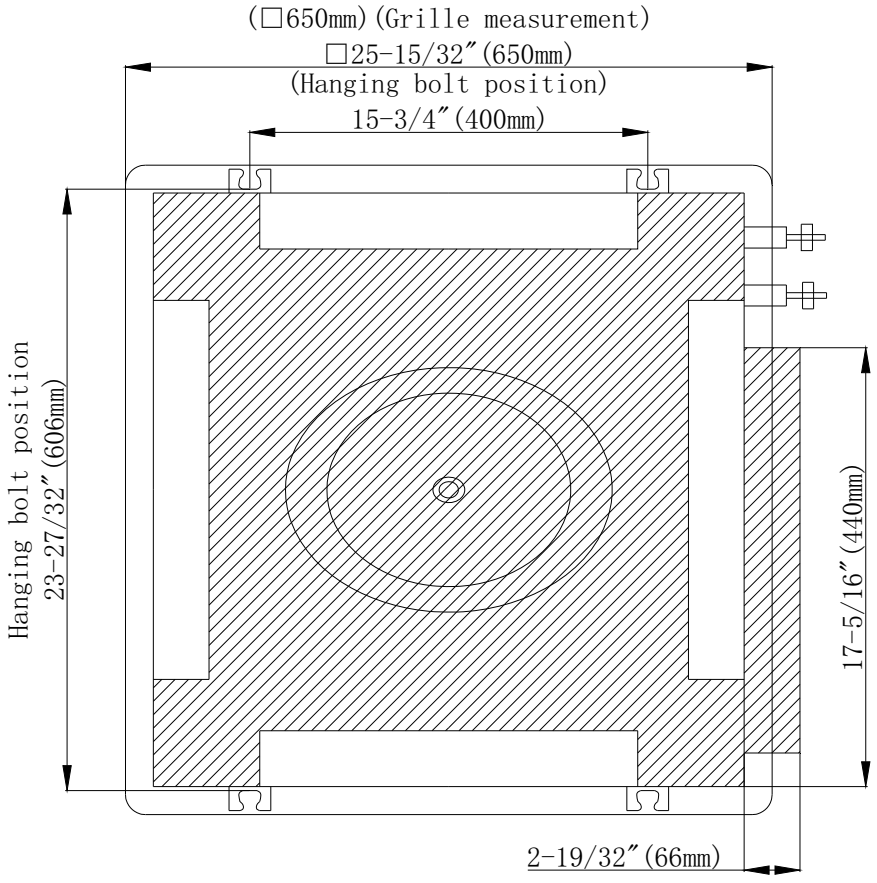
- Ensure that the smoke trap above cooker has enough capacity to obviate lampblack to prevent the indraft of the lampblack by the air conditioner.
- Keep the air conditioner far from the kitchen so that the lampblack would not be indraft by the air conditioner.

1.3.3 Caution for Installation

1） Important notice:

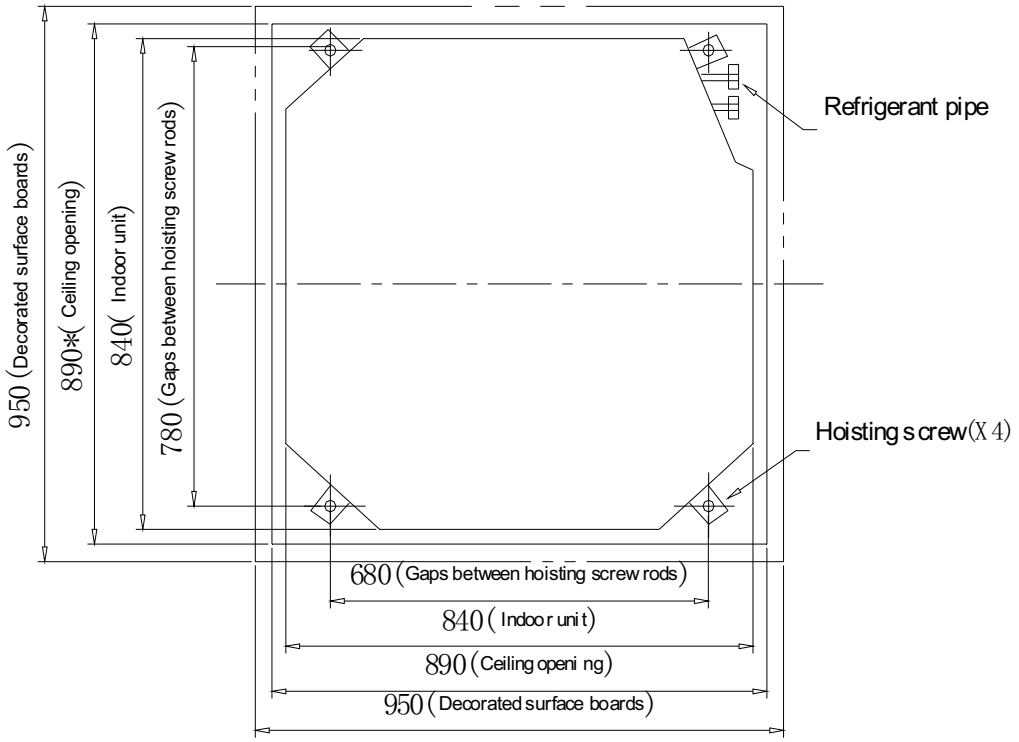
- To guarantee the good performance, the unit must be installed by professional personnel according with this instruction.
- Please contact the local INVENTOR special nominated repair department before installation. Any malfunction caused by the unit that is installed by the department that is not special nominated by INVENTOR would not deal with on time by the inconvenience of the business contact.

2） Dimension of ceiling opening and location of the hoisting screw (M10)



ICI-12/ICI-18

Figure 1-3-1


Refrigerant pipe
Hoisting screw(X 4)
950 (Decorated surface boards)
890*(Ceiling opening)
840(Indoor unit)
780 (Gaps between hoisting screw rods)
680 (Gaps between hoisting screw rods)
840 (Indoor unit)
890 (Ceiling openi ng)
950 (Decorated surface boards)

ICI-24/ICI-36/ICI-45 /ICI-50

Figure 1-3-2

The drilling of holes in the ceiling must be done by the professional personnel.

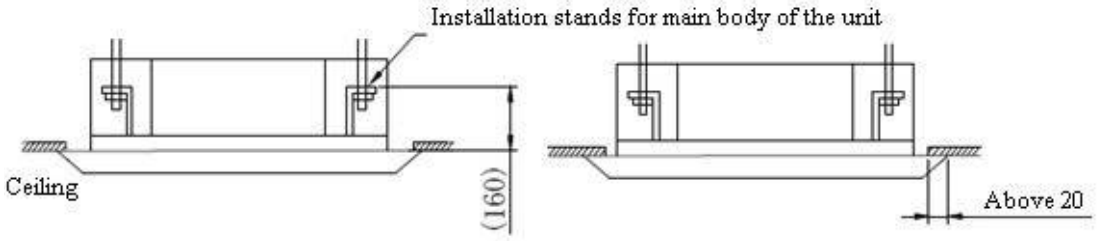


Figure 1-3-3

Cautions:

The dimension for the ceiling openings with * marks can be as large as 910mm. But the overlapping sections of the ceiling and the decorated surface boards should be maintained at no less than 20mm.

3） Main body of hoisting air conditioner

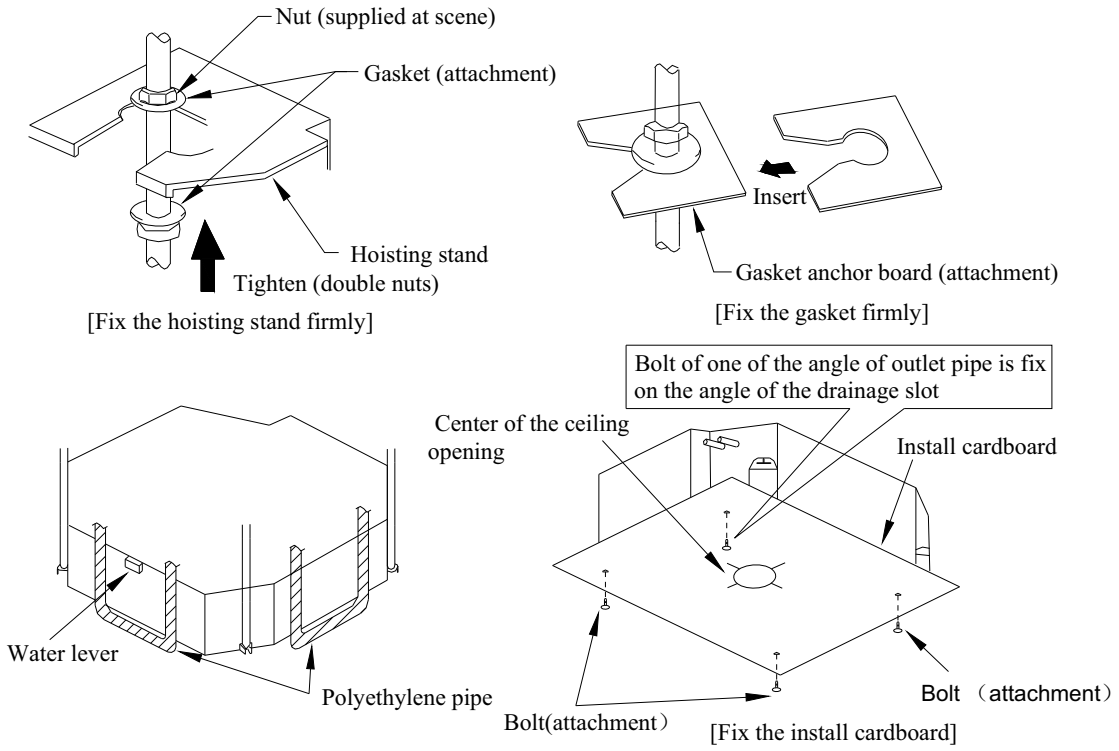


Figure 1-3-4

◆ The primary step for install the indoor unit.

When attach the hoisting stand on hoisting screw, do use nut and gasket individually at the upper and lower of the hoisting stand to fix it. The use of gasket anchor board can prevent gasket break off.

◆ Use install cardboard

Please refer to the install cardboard about the dimension of ceiling opening.

The central mark of the ceiling opening is marked on the install cardboard.

Install the install cardboard on the unit by bolt (3 piece), and fix the angle of the drainage pipe at the outlet vent by bolt.

◆ Adjust the unit to the suitable install place.

◆ Check if the unit is horizontal.

Inner drainage pump and bobber switch are included in the indoor unit, check if 4 angle of every unit are horizontal by water lever. (If the unit is slant toward the opposite of the coagulate water flow, there may be malfunction of the bobber switch and lead water drop.)

◆ Backout the gasket anchor board used to prevent gasket break off and tighten the nut on it.

◆ Backout the install cardboard.

Cautions:

Please do tighten the nuts and bolts to prevent air conditioner break off.

1.3.4 Dimension Data

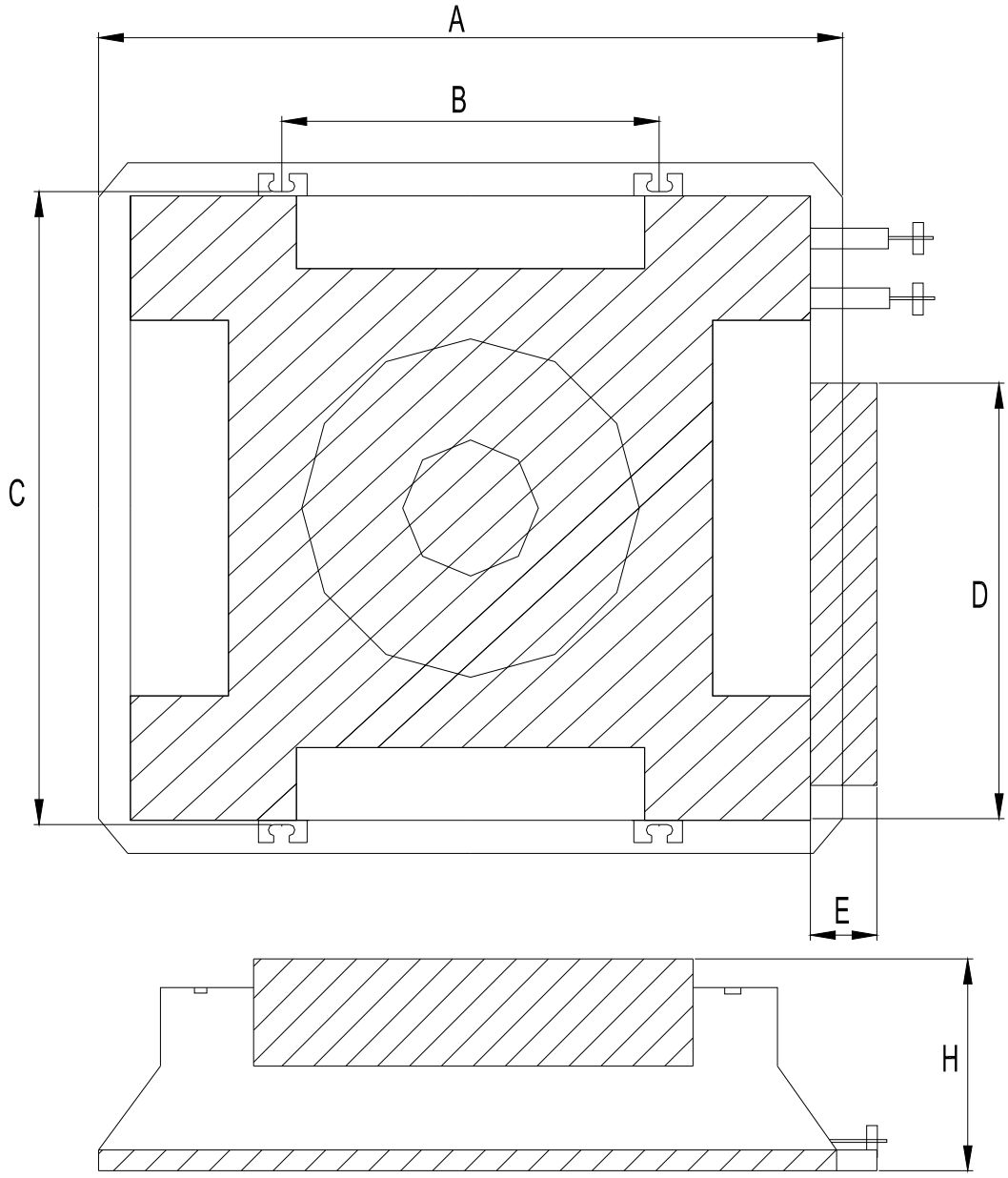


Figure 1-3-5

Model	H	A	B	C	D	E
ICI-12	245	650	400	606	440	66
ICI-18						
ICI-24	275	950	680	840	720	76
ICI-36	345	950	680	840	720	76
ICI-45						
ICI-50						

1.3.5 Installation Clearance Data

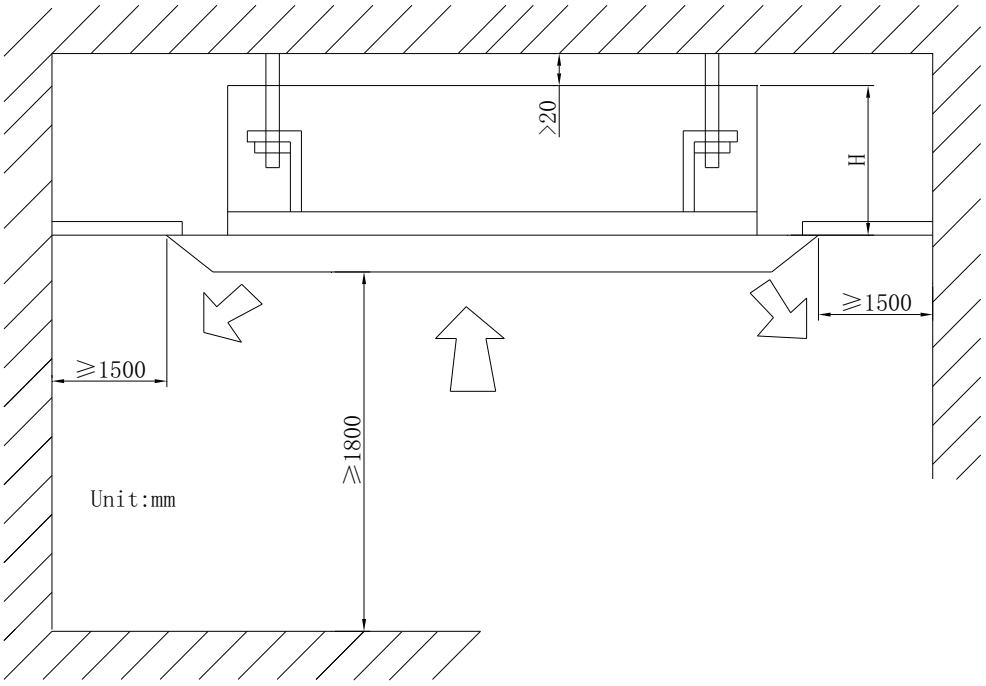


Figure 1-3-6

Models	H(mm)
ICI-12 ICI-18	230
ICI-24	260
ICI-36 ICI-45 ICI-50	320

1.3.6 Drain Piping Work

1） Installation of Drainage Pipeline

- When connecting the drainage pipe with the unit, do not apply excessive force to the pipeline at the side of the unit. The fixing position of the pipeline shall be near the unit.
- Purchase general-purpose hard PVC pipe locally to be used as the drainage pipeline. When carrying out connection, place the end of the PVC pipeline into the drainage hole. Use flexible drainage tube and tighten it with thread loop. Never use adhesive to connect the drainage hole and the flexible drainage tube. (As shown in Figure 1-3-7)
- When the laid drainage pipe is used for multiple units, the common pipe shall be about 100mm lower than the drainage outlet of each set of unit. A pipe with thicker wall shall be used for such purpose.

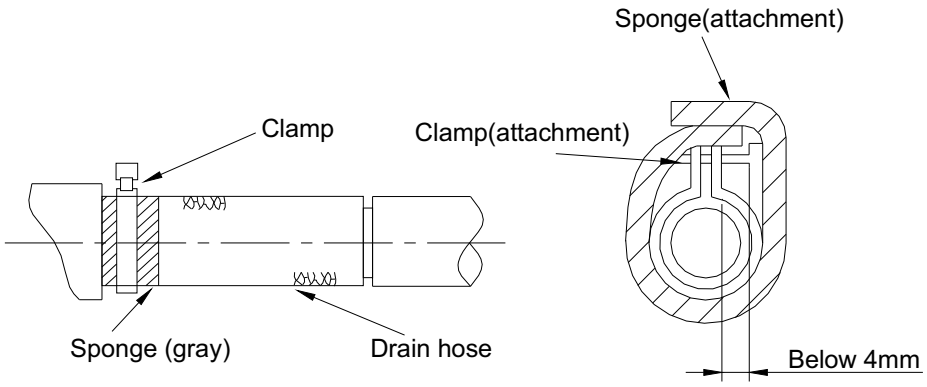


Figure 1-3-7

2） Testing of Drainage System

- After the electrical installation is completed, carry out the testing of the drainage system.
- During the test, check if the water correctly flows through the pipelines. Carefully observe the joints to ensure that there is no leakage. If the unit is to be installed in a new house, carry out testing before decorating the ceiling.

3） Matters of Attention

- The diameter of the drain hose should be equal or bigger than the connection pipe's. (The diameter of polythene pipe: Outer diameter 25mm Surface thickness ≥1.5mm)
- Drain hose should be short and drooping gradient should at less 1/100 to prevent the formation of air bubble.
- If drain hose cannot has enough drooping gradient, drain raising pipe should be added.
- To prevent bent of the drain hose, the distance between hoisting stand should is 1 to 1.5m. (As shown in Figure 1-3-8)

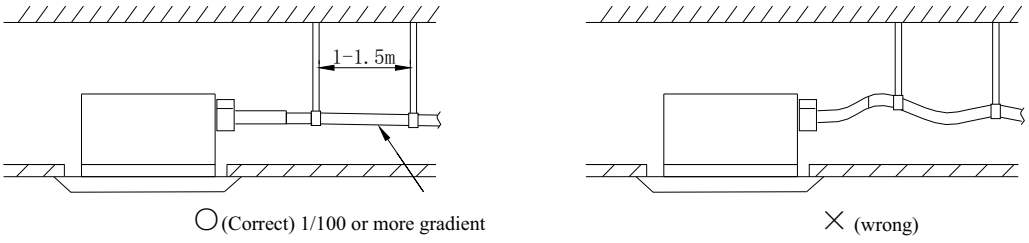


Figure 1-3-8

- The install height of the drain raising pipe should less than 280mm.
- The drain raising pipe should form a right angle with the unit, and distance to unit should not beyond 300mm. (As shown in Figure 1-3-9)

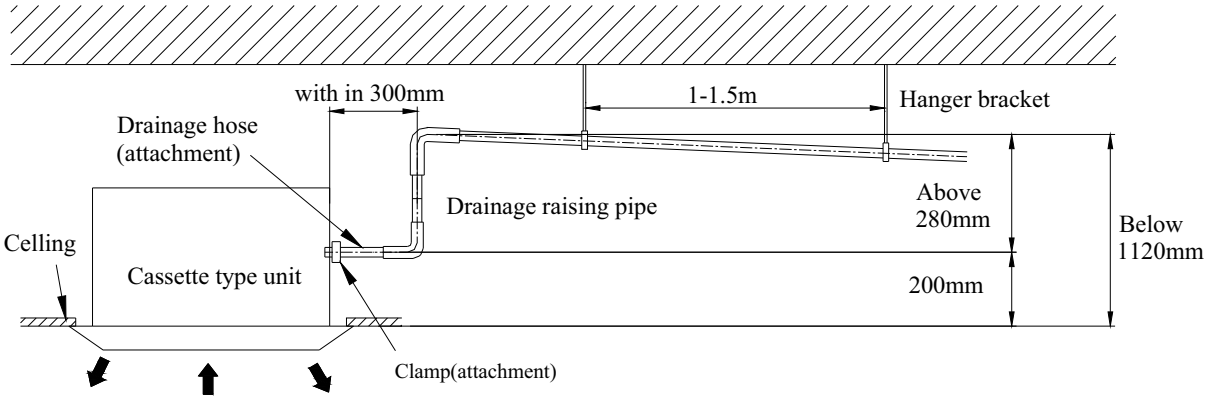


Figure 1-3-9

- The slant gradient of the attached drain hose should be within 75mm so that the drain hole doesn't has to endure the unnecessary outside force. (As shown in Figure 1-3-10)

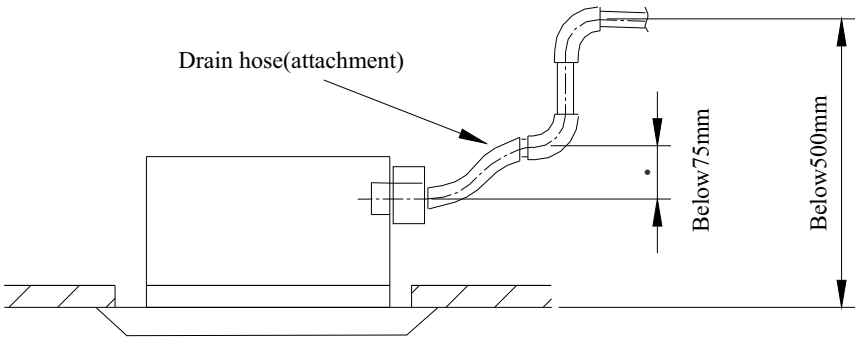
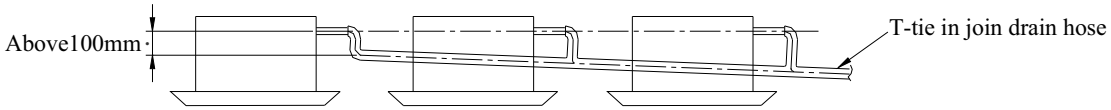


Figure 1-3-10

- Please install the drain hose according to the following process if several drain hoses join together. (As shown in Figure 1-3-11)



The specs of the selected join drain hose should fits the running capacity of the unit.

Figure 1-3-11

- Check the smoothness of drain after installation.
- Check the drain state by immiting 600cc water slowly from the outlet vent or test hole. (As shown in Figure 1-3-12)
- Check the drain in the state of refrigerating after installation of the electric circuit.

[Way of immiting]

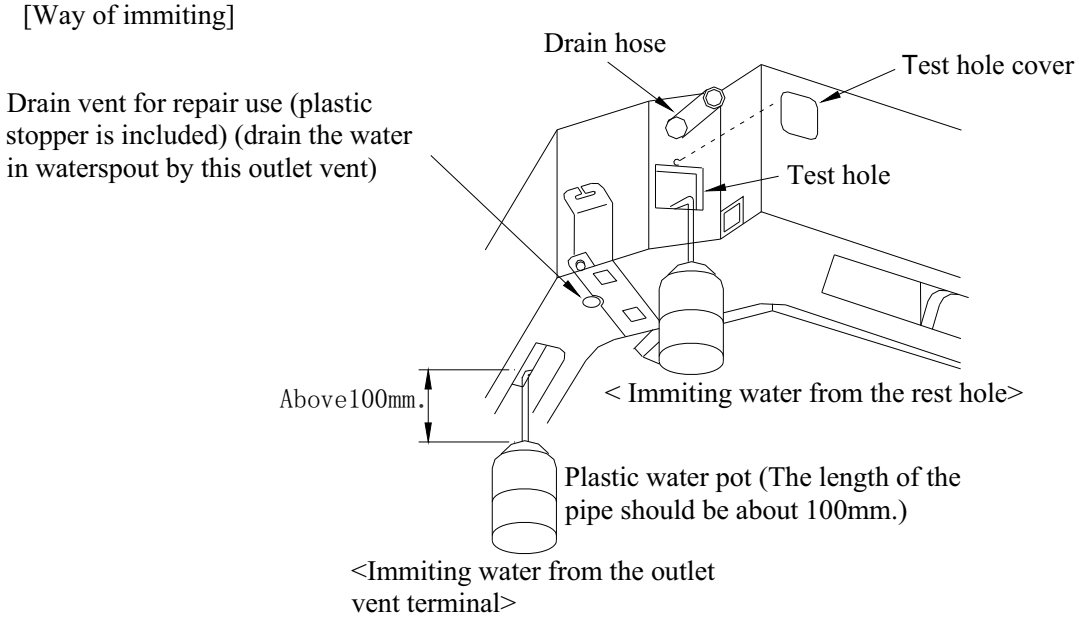


Figure 1-3-12

1.3.7 Installation of panel

1） Set the panel to the indoor unit body by matching the position of the swing flap motor of the decoration panel to the piping position of the panel to the piping position of the indoor unit as shown in Figure 1-3-13.

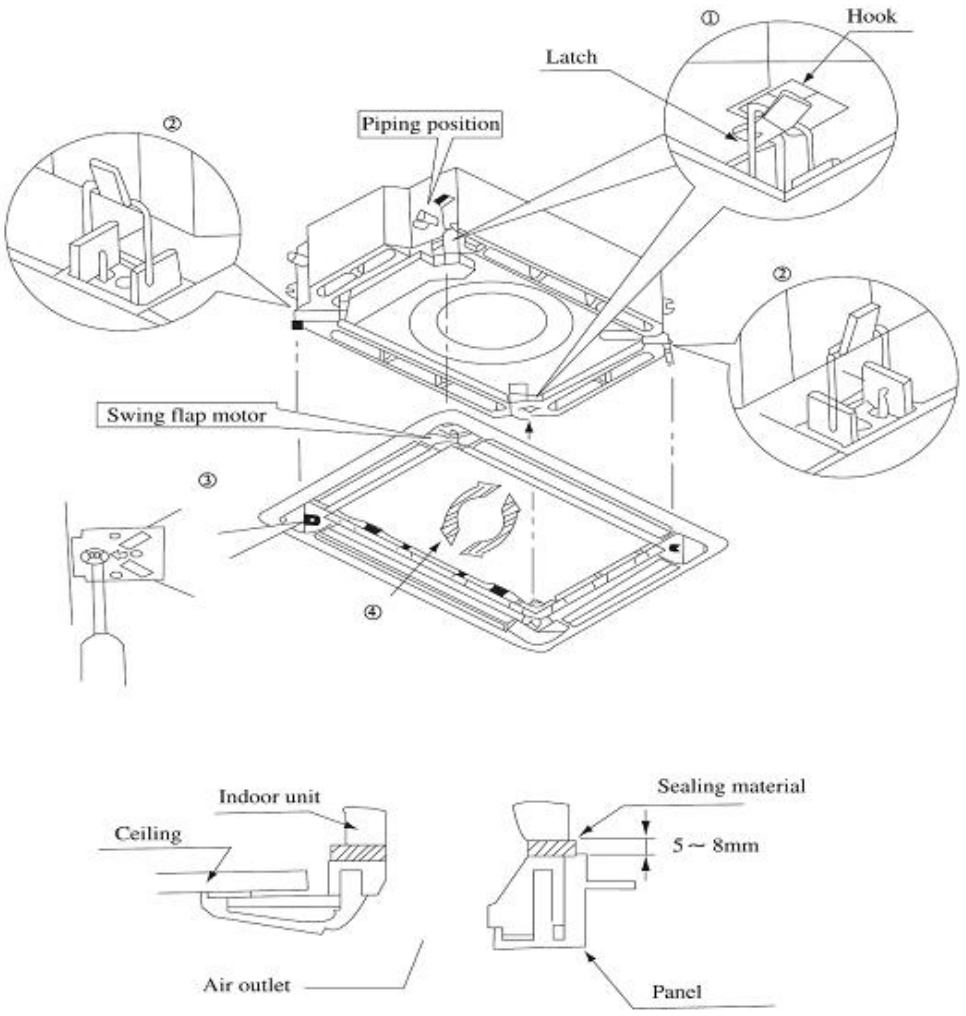


Figure 1-3-13

- Hang the latch, which is located on the opposite side of the swing flap motor on the panel, temporarily to the book of the indoor unit. (2 Positions)
- Temporarily hang the remaining 2 latches to the hooks on the sides of the indoor unit.(Be careful not to let the swing motor lead wire get caught in the sealing material.)
- Screw all 4 hexagon head screws located right beneath the latches in approximately 15mm.(Panel will rise)
- Adjust the panel by turning it to the arrowed direction in Fig.4 so that the ceiling opening is completely covered.
- Tighten the screws until the thickness of the sealing material between the panel and the indoor unit body is reduced to 5~8 mm.

2） Precautions:

◆ Improper screwing of the screws may cause the troubles shown in Figure 1-3-14.

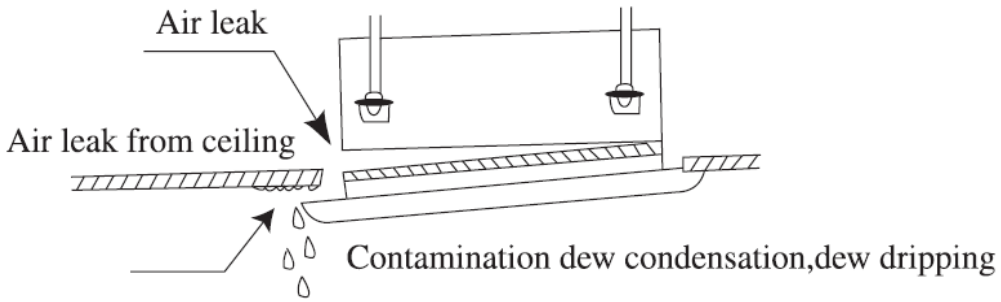


Figure 1-3-14

◆ If gap is still left between the ceiling and the panel after screwing the screws, readjust the height of the indoor unit body (Refer to Figure 1-3-15)

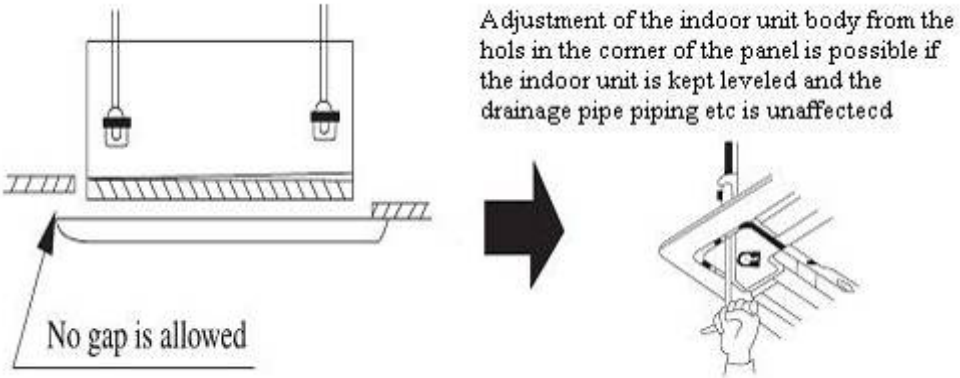

Adjustment of the indoor unit body from the hols in the corner of the panel is possible if the indoor unit is kept leveled and the drainage pipe piping etc is unaffectecd
No gap is allowed

Figure 1-3-15

◆ After fixing be sure no gap left between the ceiling and the panel

3） Wiring of the decoration panel.

◆ Connect the joints for swing flap motor lead wire (at 2 places) installed on the panel (Refer to Figure 1-3-16)

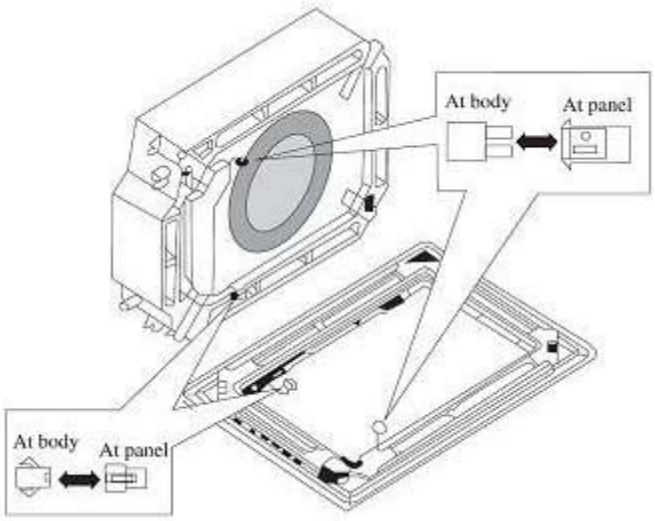


Figure 1-3-16

2 OUTDOOR UNIT INSTALLATION

2.1 Before Installation

- When the unit arrives, please check if any damage due to transport is existent. If any hurt is found on the surface or inside, please declare to the transport company or the manufacturer in writing.
- Upon receipt of the unit, the unit and accessories shall be checked in accordance with the packing list. Before acceptance, it must be confirmed that the model is correct and the unit is in good shape and specification and quantity of accessories are right.
- Correct handling route and method shall be decided to prevent damage to the unit. For protecting the unit and ensuring its safety, carrying the unit with its package is recommended. If such carrying method is difficult under particular conditions, the canton shall not be removed to avoid looseness or falling during handling.
- Confirm the foundation is secure. When the unit is installed on the metal part of a building, electrical insulation must be in compliance with relevant standards.
- Confirm the installation position is away from storage zone of inflammable and explosive substances, or otherwise leakage of inflammable and explosive substances may lead to explosion or a fire.

2.2 Installation Site

- To ensure the unit in proper function, selection of installation location must be in accordance with following principles:
- Outdoor unit shall be installed so that the air discharged by outdoor unit will not r eturn and that sufficient space for repair shall be provided around the unit.
- The installation site must have good ventilation, so that the outdoor unit can take in and exhaust enough air. Ensure that there is no obstacle for the air intake and exhaust of the outdoor unit. If there is any obstacle blocking the air intake or exhaust, remove it.
- Place of installation shall be strong enough to support the weight of outdoor unit, and it shall be able to insulate noise and prevent vibration. Ensure that the wind and noise from the unit will not affect your neighbors.
- Avoid direct sunshine over the unit. It is better to set up a sun shield as the protection.
- Place of installation must be able to drain the rainwater and defrosting water.
- Place of installation must ensure the unit will not be buried under snow or subject to the influence of rubbish or oil fog.
- The installation site must be at a place where the air exhaust outlet does not face strong wind.
- Outdoor unit should be hoisted through indicated hoisting holes. During hoisting, special attention must be paid to the unit to prevent collision into its sheet metal parts to avoid rust.

- Rubber cushion or spring shock absorber shall be used for outdoor unit to avoid excessive noise and vibration.
- Rubber cushion or spring shock absorber shall be used for outdoor unit to avoid excessive noise and vibration.
- Only professional personnel are allowed for unit installation.

2.3 Caution for Installation

- Installation of outdoor unit shall not allow discharged air to return, and sufficient maintenance space shall be left around the unit.
- Installation position must be well-ventilated, enabling the unit to absorb and discharge enough air. Inlet and outlet must be free of obstruction. Any obstacle blocking air going in and out must be removed.
- When outdoor unit is mounted on the secure floor such as concrete, bolts and nuts in M10 can used for fixing the unit. Uprightness or levelness of the unit must be ensured.
- Outdoor unit should be hoisted through indicated hoisting holes. During hoisting, special attention must be paid to the unit to prevent collision into its sheet metal parts to avoid rust.
- Rubber cushion or spring shock absorber shall be used for outdoor unit to avoid excessive noise and vibration. Uprightness or levelness must be ensured.
- In installation of drain pipe, the connector of the drain pipe shall be inserted into a drain hole on the chassis of the outdoor unit. And then a drain pipe shall be connected to the drain connector. (If the drain connector is used, installing height of the outdoor unit shall be at least 5cm).
- If pipe is put through wall, a wall pipe must be used.
- Installation dimension must be in line with requirements by the instructions. Outdoor unit must be fixed on the mounting position.
- Only professional personnel are allowed for unit installation

2.4 Dimension Data

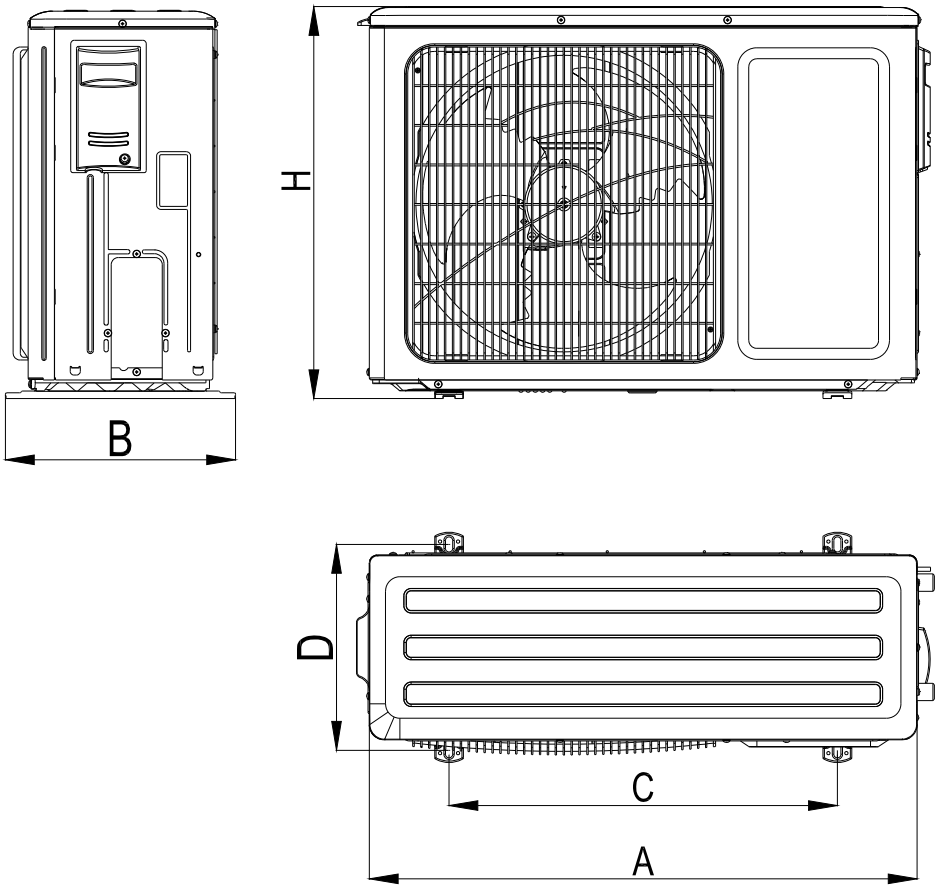


Figure 2-4-1

Unit：mm

Model	A	B	C	H	D
ULS-09	848	320	540	540	286
ULS-12					
ULS-18					
ULS-24	1018	412	700	572	300
ULS-36	1018	412	840	572	378
ULT-36					
ULT-45	950	412	1250	572	378
ULT-50					
ULT-60					

2.5 Installation Clearance Data

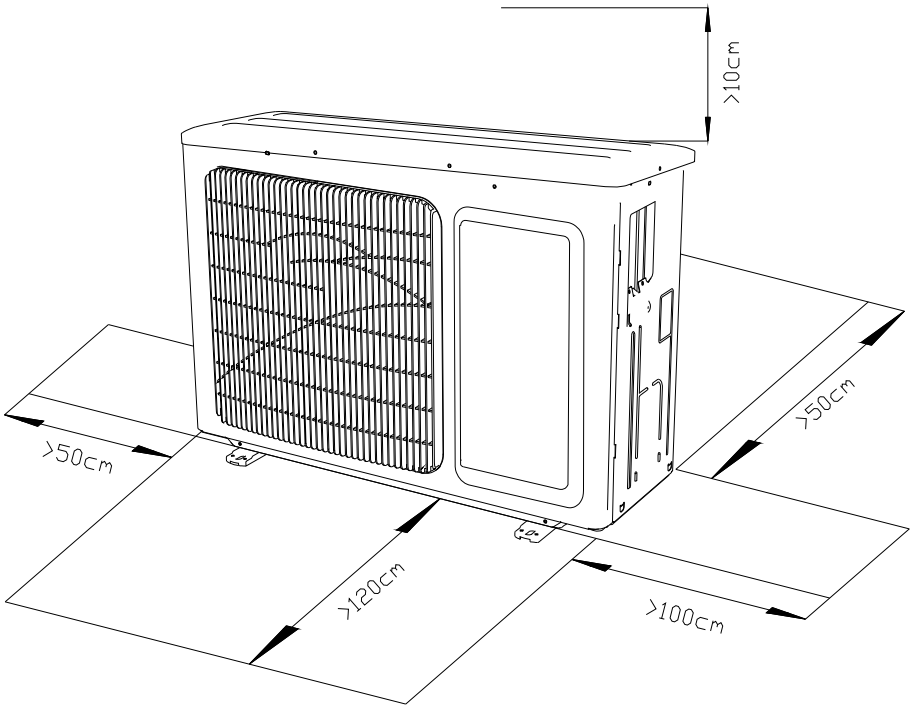


Figure 2-5-1

3 REFRIGERATION PIPING WORK

3.1 Refrigeration Piping Work Procedures

1） Connecting pipelines

◆ Connection pipes must be in accordance with the following requirements: the basic principle --- keeping dry, clean and no leakage inside.

The 3 principles of refrigerant piping

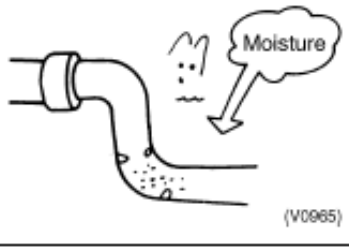
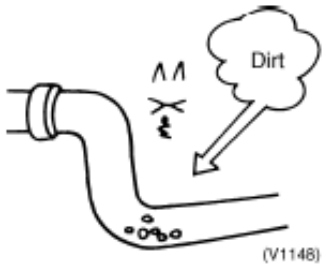
Dry	Clean	Air tight
Make sure there is no moisture inside the pipes	Make sure there is no dirt inside the pipe	Make sure the refrigerant does not leak out
		

Figure 3-1-1

◆ Align copper pipe flare with the center of screwed connector and tighten fully the nut of the flare by hand.

◆ Tighten the flare nut with a torque spanner until the torque spanner makes a click, as shown in Figure 3-1-1. Moment needed for tightening a nut is shown in Tab. 3-1-1.

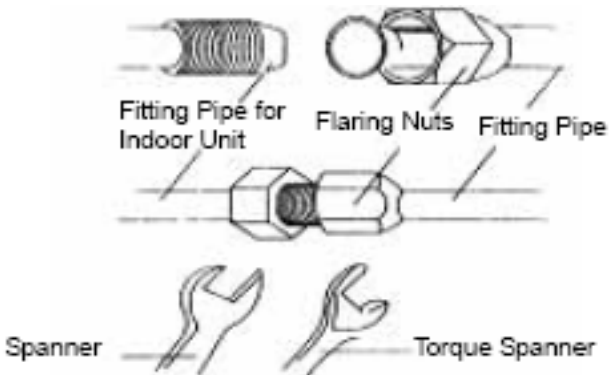


Figure 3-1-2

Form 3-1-1 the tightening torque needed for tightening nut

Pipe diameter	Tightening torque
1/4 "	15-30 (N·m)
3/8 "	35-40 (N·m)
5/8 "	60-65 (N·m)
1/2 "	45-50 (N·m)
3/4 "	70-75 N·m)

- Curvature of piping shall not be too small, or otherwise piping may be broken. So installation personnel should use a pipe bender to bend pipes.
- Upward or longitudinal welding joint method is usually applied to the welding of pipelines. The welding method that mouth of pipe is downward (face-down welding) should be avoided as far as possible, because such method is prone to welding defects and even would cause leakage, as shown in Figure 3-1-3.

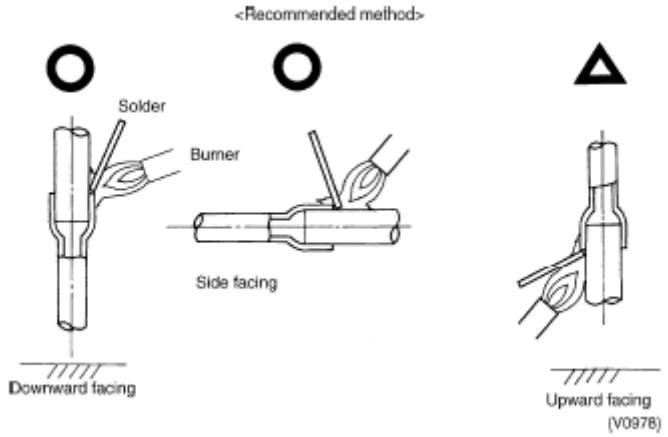


Figure 3-1-3

- Uninsulated connecting pipes and connectors should be packed with sponge and tied with plastic adhesive tapes.

2） Vacuum-pumping and leak detection

- Dismantle the bonnet of refrigerant valve and air valve.
- Align with the center of piping and adequately tighten nuts of connecting pipes by hand
- Tighten the nuts with a spanner.
- Remove the one way valve cap of air valve.
- Unscrew the spool of refrigerant valve for 1/4 turn with a socket head wrench, and at the same time push up the spool of air valve with a screwdriver to let air give off.
- Air exhaust continues for 15 seconds until coolant gas appears, immediately shut off one way valve and tighten the valve cap.
- Totally open the spool of refrigerant valve and air value (as shown in Figure 3-1-4)

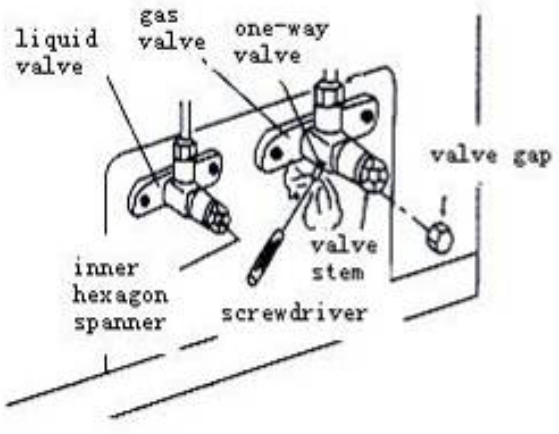


Figure 3-1-4

- Tighten the valve caps and use soapy water or a leak detector to check any leakage on indoor unit, outdoor unit and connection parts of pipes.

Caution：

If conditions are allowed, a vacuum pump shall be used for drawing off air inside the system at a valve. Method for creation of vacuum by using a vacuum pump is as follows:

- Take out the nut cover of the inlet for refrigerant.
- Connect the tube of the vacuum watch with the vacuum pump, having the low-pressure end linking to the inlet for refrigerant. (As shown in Figure 3-1-5)

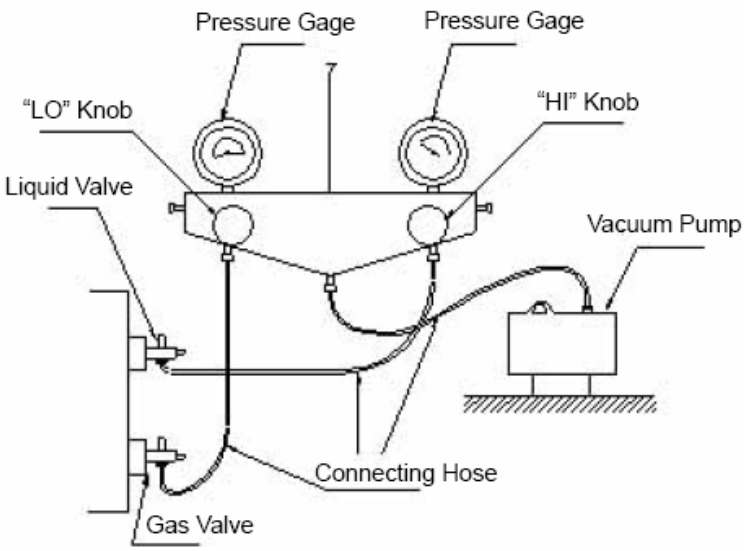


Figure 3-1-5

- Starting the vacuum pump, when the indicator turns to-1 bar, closing the low pressure handle and stopping vacuumize. Keep for 15 minutes, ensuring the pressure of the vacuum watch remains.
- Take out the valve cover of the gas valve together with the liquid valve.
- Loosing the cord of liquid valve until the pressure rise to 0 bar.
- Dismantle the tube from the cover of the inlet for refrigerant then, tighten the cover.
- Loose the valve cord of the gas valve as well as the liquid valve entirely.
- Tighten the valve cover of the gas valve and liquid valve so as to check whether leakage occurred.

3) Installation of Protective Layer of Connecting Pipe

- To avoid generation of condensate on the connecting pipe and avoid leakage, the big pipe and the small pipe of the connecting pipe must be covered by thermal insulation materials, be bundled by adhesive tape, and be isolated from air.
- The joint connecting to the indoor unit must be wrapped by thermal insulation material. There shall be no gap between the connecting pipe joint and the wall of the indoor unit. Refer

to Figure 3-1-6.

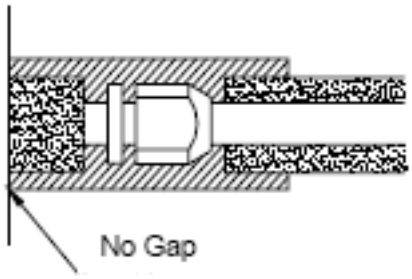


Figure 3-1-6

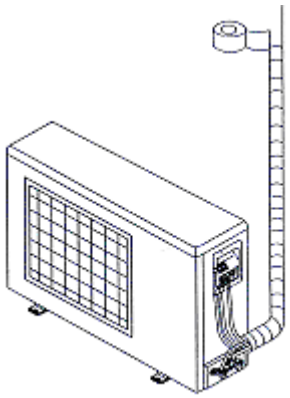


Figure 3-1-7

- Use adhesive tape to bundle the connecting pipe and the cables together. To prevent condensate from overflowing out from the drainage pipe, separate the drainage pipe firm the connecting pipe and the cables.
- Use thermal insulation tape to wrap the pipes from the bottom of the outdoor unit until the upper end of the pipe where the pipe enters the wall. When wrapping thermal insulation tape, the later circle of tape must cover half of the front circle of tape (Figure 3-1-7).
- Wrapped pipe must be fixed to wall using pipe clamps.

Caution:

- After the pipes are wrapped by protective materials, never bend the pipes to form very small angle, and otherwise the pipes may crack or break.
- Do not wrap the protective tape too tight, otherwise the efficiency of thermal insulation may be decreased. Ensure that the condensate drainage flexible tube is separate from the bundled pipes.
- After the protective work is completed and the pipes are wrapped, use seal material to block the hole in the wall, so as to prevent rain and wind from entering the room.

3.2 Caution in Connecting Pipes

Arrangement of connecting pipes shall be performed according to sit conditions with reference to the following principles.

- Try to shorten the length of connecting pipes, within 5m for the better.
- Try to reduce height difference between indoor unit and outdoor unit.
- Try to reduce number of joint bends of connecting pipes.
- If the length of connecting pipes is more than 20m, adequacy of lubricant of the system must be checked; and if necessary, add more lubricant properly.
- Filling amount of refrigerant in the system is matched to a 7m connecting pipe. If the

connecting pipe is needed to lengthen, appropriate amount of refrigerant should be added. How much refrigerant should be added for every meter extension refers to the following table. Allowable maximum pipe length is 30m.

- If height difference between indoor unit and outdoor unit exceeds 10m in installation of air conditioner, an oil return bend must be mounted at an interval of 6m.
- If heights of indoor unit and outdoor unit are different, pipes should be laid out with reference to Figure 3-2-1.

———Refrigerant pipe (thin)

- - - - - - Air pipe (large)

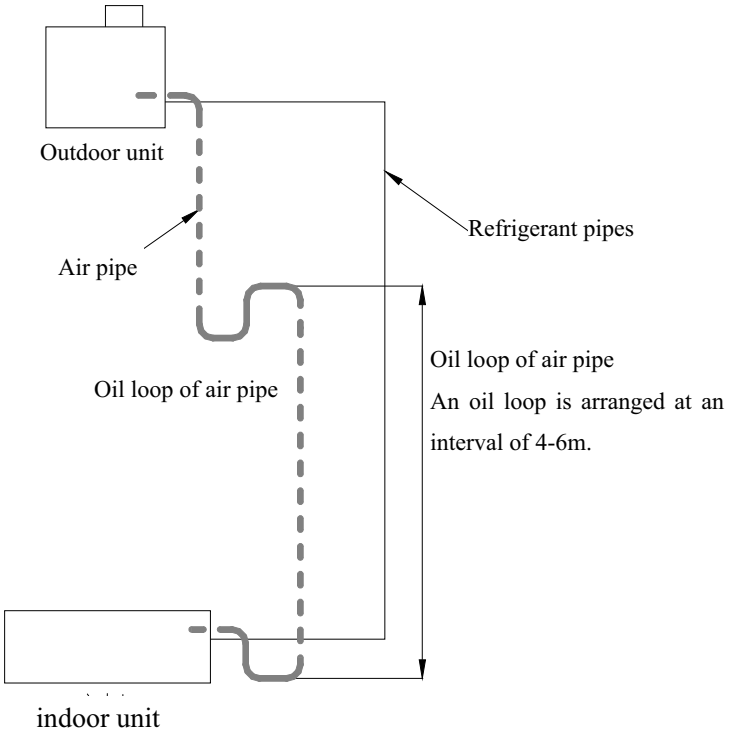

Outdoor unit
Refrigerant pipes
Air pipe
Oil loop of air pipe
Oil loop of air pipe
An oil loop is arranged at an interval of 4-6m.
indoor unit

Figure 3-2-1

3.3 Specification of Connection Pipe

Model	External Diameter		Maximum Length of Connection Pipe	Maximum Difference in Height between Outdoor and Indoor Unit	Additional Charge of Refrigerant
	Gas Pipe	Liquid Pipe	(m)	(m)	(g/m)
ULS-09	φ3/8 "	φ1/4 "	20	15	15
ULS-12	φ1/2 "				
ULS-18					
ULS-24	φ5/8 "	φ3/8 "	30	15	60
ULS-36	φ3/4 "	φ1/2 "	50	30	120

ULT-36					
ULT-45					
ULT-50					
ULT-60	φ7/8 "				

4 ELECTRIC WIRING WORK

4.1 Wiring Principle

4.1.1General

- Perform wiring of the power supply in conformance with the regulations of the local electric company.
- For the control wires connecting indoor units, and between indoor and outdoor units, use of double-core shield wires is recommended to prevent noise trouble.
- Be sure to set the earth leakage breaker and the switches to the power supply section of the indoor unit.
- Supply power to each outdoor unit and provide an earth leakage breaker or hand switch for each outdoor unit.
- Store wiring system for control and refrigerant piping system in the same line.
- Arrange the cables so that the electric wires do not come to contact with high-temperature part of the refrigerant pipe; otherwise coating melts and an accident may be caused.
- Do not turn on power of the indoor unit until vacuuming of the refrigerant pipe will finish.
- Installation should be conducted by National Wiring Regulation.
- The rated voltage and exclusive power supply must be adopted for the air conditioners.
- The power cable should be reliable and fixed, in order to avoid the wiring terminal be suffered from force. And do not drag the power cable forcibly.
- The wire diameter of power cable should be large enough, if power cable and connection wire be damaged, it should be replaced by the exclusive cable.
- All electric installation must be done by professional personnel according to local law, regulation and this manual.
- It should be reliably earthed, and it should be connected to the special earth device, the installation work should be operated by the professional.
- The creepage protect switch and air switch must be installed.
- Air switch should have the thermal dropout and magnetic dropout function, in order to avoid the short circuit and overload.
- The on spot connection should refer to the circuit diagram, which is stuck on the unit body.
- The unit should be reliably earth, if it is improperly earthed that may cause electric shock or fire.

- Air conditioner is the “I” class electric appliance, thus please do conduct reliable grounding measure.
- The yellow-green two-color wiring of air conditioner is grounding wire and cannot be used for other purposes. It cannot be cut off and be fixed by screw, otherwise it would cause electric shock.
- The user must offer the reliable grounding terminal. Please don’t connect the grounding wire to the following places:
  ① Water pipe；
  ② Gas pipe；
  ③ Blowing pipe；
  ④ Other places that professional personnel consider them unreliable.

4.1.2 Connection of electric wires with the terminal

1） Caution

Before installing the electrical equipment, please pay attention to the following matters which have been specially pointed out by our designers:

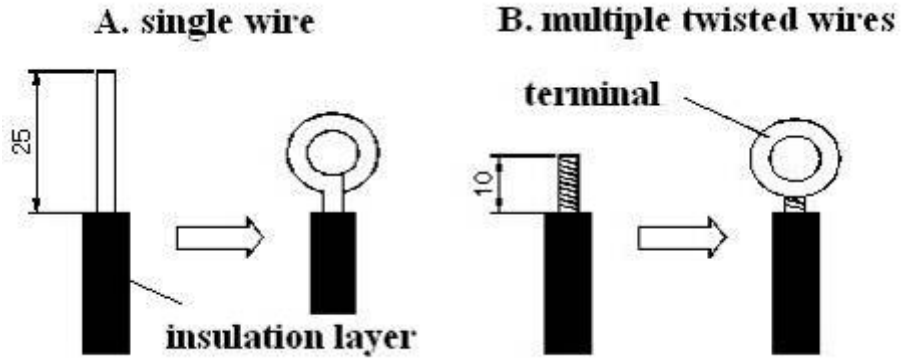
① Check to see if the power supply used conforms to the rated power supply specified on the nameplate.
② The capacity of the power supply must be large enough. The section area of fitting line in the room shall be larger than 2.5mm2.
③ The lines must be installed by professional personnel.
④ An electricity leakage protection switch and an air switch with gap between electrode heads larger than 3 mm shall be installed in the fixed line.

2） Connection of single wire

① Use wire stripper to strip the insulation layer (25mm long) from the end of the single wire.
② Remove the screw at the terminal board of the air-conditioning unit.
③ User pliers to bend the end of the single wire so that a loop matching the screw size is formed.
④ Put the screw through the loop of the single wire and fix the loop at the terminal board.

3） Connection of multiple twisted wires

① Use wire stripper to strip the insulation layer (10mm long) from the end of the multiple twisted wires.
② Remove the screw at the terminal board of the air-conditioning unit.
③ Use crimping pliers to connect a terminal (matching the size of the screw) at the end of the multiple twisted wires.
④ Put the screw through the terminal of the multiple twisted wires and fix the terminal at the terminal board.



Warning:

- If the power supply flexible line or the signal line of the equipment is damaged, only use special flexible line to replace it.
- Before connecting lines, read the voltages of the relevant parts on the nameplate. Then carry out line connection according to the schematic diagram.
- The air-conditioning unit shall have special power supply line which shall be equipped with electricity leakage switch and air switch, so as to deal with overload conditions.
- The air-conditioning unit must have grounding to avoid hazard owing to insulation failure.
- All fitting lines must use crimp terminals or single wire. If multiple twisted wires are connected to terminal board, arc may arise.
- All line connections must conform to the schematic diagram of lines. Wrong connection may cause abnormal operation or damage of the air-conditioning unit.
- Do not let any cable contact the refrigerant pipe, the compressor and moving parts such as fan.
- Do not change the internal line connections inside the air-conditioning unit. The manufacturer shall not be liable for any loss or abnormal operation arising from wrong line connections.

4.1.3 Power Cable Connection

1) Air-conditioning unit with single-phase power supply

① Remove the front-side panel of the outdoor unit.

② Pass the cable though rubber ring.

③ Connect the power supply cable to the “L, N” terminals and the grounding screw.

④ Use cable fastener to bundle and fix the cable.

2) Air-conditioning unit with 3-phase power supply

① Remove the front-side panel of the outdoor unit.

② Attach rubber ring to the cable-cross hole of the outdoor unit.

③ Pass the cable though rubber ring.

④ Connect the power cable to the terminal and earthing screws marked “L1, L2, L3 & N”.

⑤ Use cable fastener to bundle and fix the cable.

Caution:

- For air-conditioner with auxiliary heater, it is required to connect the power cable to the “L1, L2 L3”terminals and the grounding screw.

4.1.4 Connection of Signal Line of Wire Controller

Caution:

Take great care when carrying out the following connections, so as to avoid malfunction of the air-conditioning unit because of electromagnetic interference.

- The signal line of the wire controller must be separated from the power line and the

connecting line between the indoor unit and the outdoor unit.

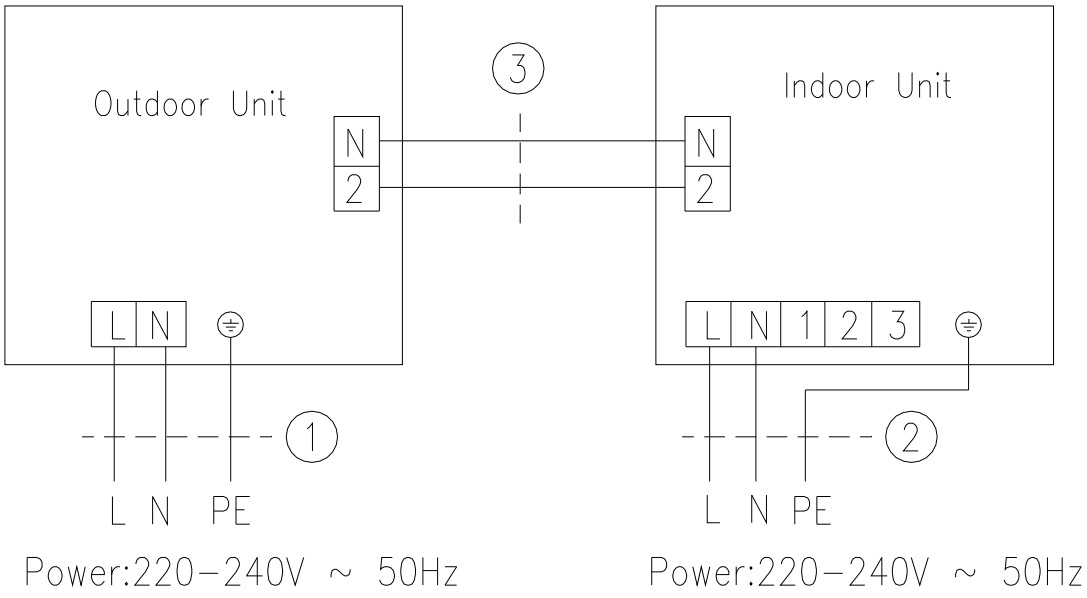
- ◆ In case the unit is installed in a place vulnerable by electromagnetic interference, it is better to use shielded cable or double-twisted cable as the signal line of the wire controller.
- Open the cover of the electric box of the indoor unit.
- Pull the signal cable of the wire controller through the rubber ring.
- Plug the signal line of the wire controller onto the 4-bit pin socket at the circuit board of the indoor unit.
- Use cable fastener to bundle and fix the signal cable of the wire controller.

4.1.5Connection of wires

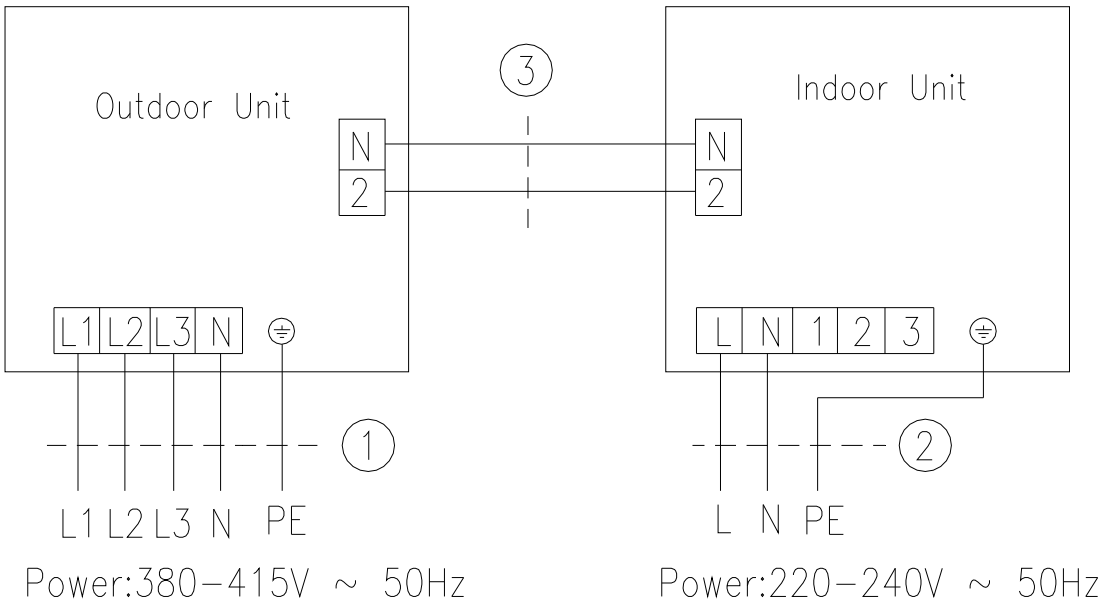
① Remove the board on the right side of outdoor unit and put through the wire running hole on the outdoor unit and put on a rubber ring.
② Remove wire holders and connect the power cord to the terminal and fix it.
③ Secure the power connecting cord and signal control cable with wire holders and then connect corresponding adapters.
④ Check if wires are fixed properly.
⑤ Fit on the front side board.

4.2 Electric Wiring Design

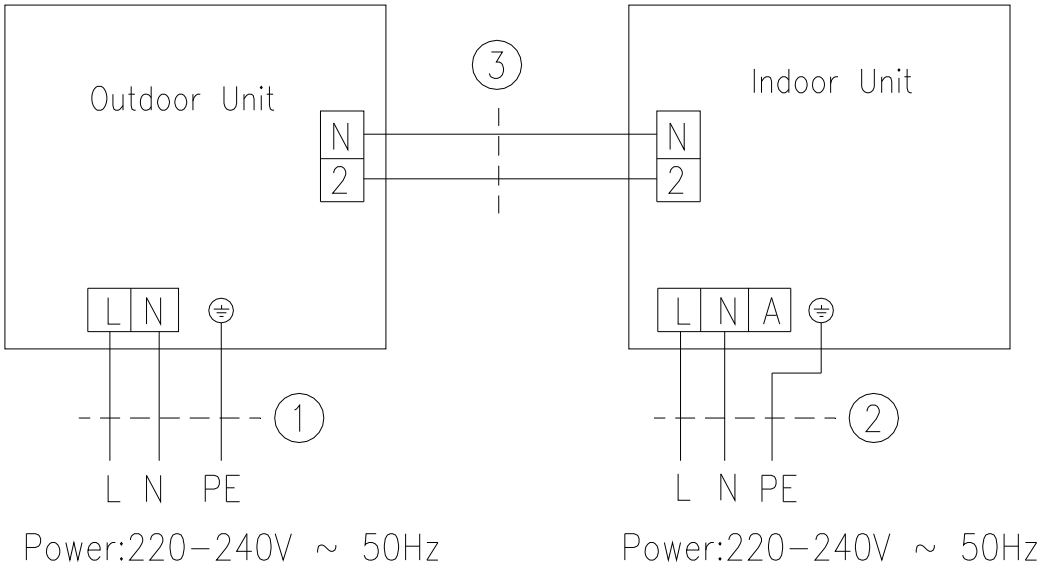
4.2.1 ULS-09+IDI-09, ULS-12+IDI-12,
ULS-18+IDI-18, ULS-24+IDI-24,
ULS-36+IDI-36



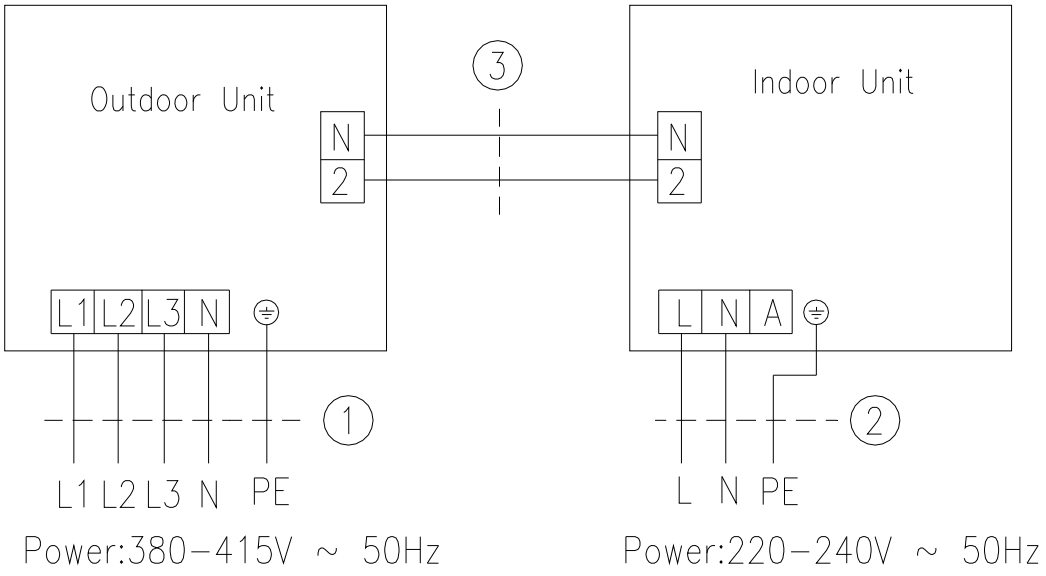
ULT-36+IDI-36, ULT-45+IDI-45,
ULT-50+IDI-50, ULT-60+IDI-60



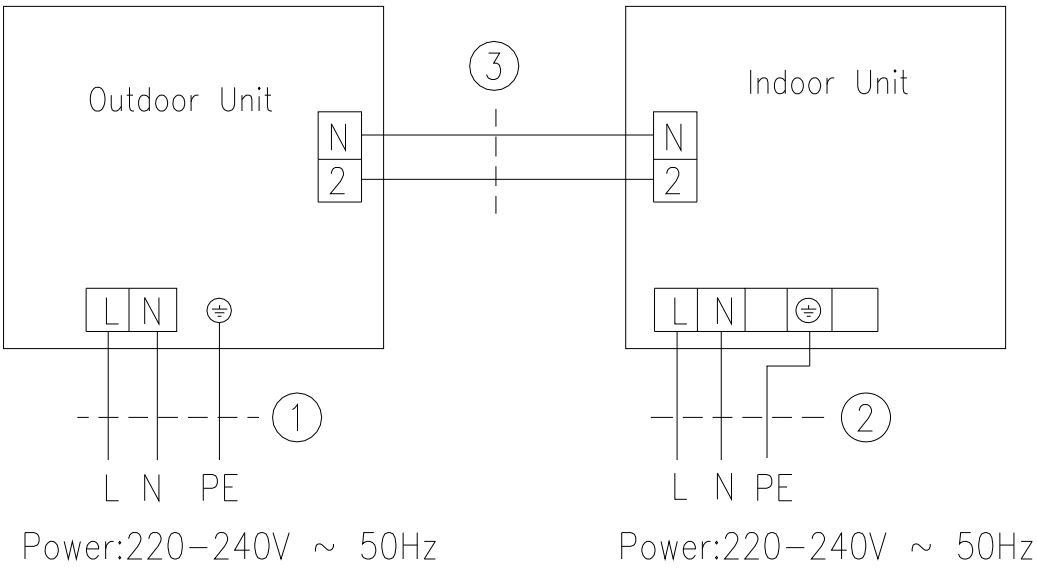
4.2.2 ULS-09+IKI-09, ULS-12+IKI-12,
ULS-18+IKI-18I, ULS-24+IKI-24,
ULS-36+IKI-36



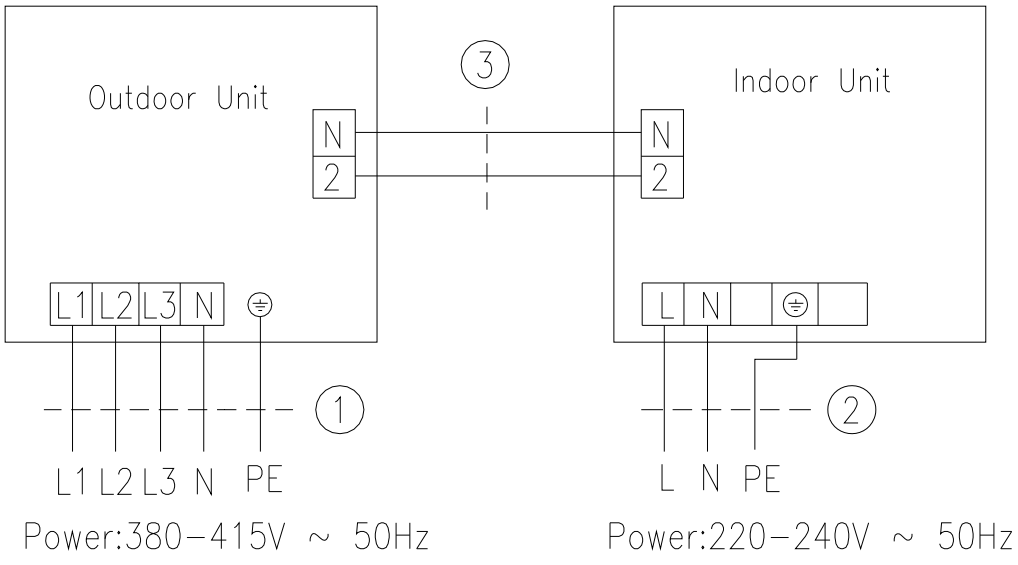
ULT-36+IKI-36, ULT-45+IKI-45,
ULT-50+IKI-50I, ULT-60+IKI-60



4.2.3 ULS-09+ICI-09, ULS-12+ICI-12,
ULS-18+ICI-8, ULS-24+ICI-24,
ULS-36+ICI-36



ULT-36+ICI-36, ULT-45+ICI-45,
ULT-50+ICI-50, ULT-60+ICI-60



4.3 Specification of Power Supply Wire and Air Switch

4.3.1 Outdoor Unit

Model	Power Supply （V，Ph，Hz）	Capability of Air Swith	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire
		(A)	(mm^2)	(mm^2)
ULS-09	220-240，1，50	10	1.5	1.5
ULS-12	220-240，1，50	13	1.5	1.5
ULS-18	220-240，1，50	20	2.5	2.5
ULS-24	220-240，1，50	25	4.0	4.0
ULS-36	220-240，1，50	40	6.0	6.0
ULT-36	380-415，3，50	16	2.5	2.5
ULT-45	380-415，3，50	20	2.5	2.5
ULT-50	380-415，3，50	20	2.5	2.5
ULT-60	380-415，3，50	20	2.5	2.5

4.3.2 Indoor Unit

- Duct Type

Model	Power Supply （V，Ph，Hz）	Capability of Air Swith	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire
		(A)	(mm^2)	(mm^2)
IDI-09	220-240，1，50	6	1.0	1.0
IDI-12	220-240，1，50	6	1.0	1.0
IDI-18	220-240，1，50	6	1.0	1.0
IDI-24	220-240，1，50	6	1.0	1.0
IDI-36	220-240，1，50	10	1.5	1.5
IDI-45	220-240，1，50	10	1.5	1.5
IDI-50	220-240，1，50	10	1.5	1.5
IDI-60	220-240，1，50	10	1.5	1.5

- Ceiling Type

Model	Power Supply （V，Ph，Hz）	Capability of Air Swith	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire
		(A)	(mm^2)	(mm^2)
IKI-09	220-240，1，50	6	1.0	1.0
IKI-12	220-240，1，50	6	1.0	1.0
IKI-18	220-240，1，50	6	1.0	1.0
IKI-24	220-240，1，50	6	1.0	1.0
IKI-36	220-240，1，50	6	1.0	1.0
IKI-45	220-240，1，50	6	1.0	1.0
IKI-50	220-240，1，50	6	1.0	1.0

- Cassette Type

Model	Power Supply （V，Ph，Hz）	Capability of Air Swith	Minimum Sectional Area of Earth Wire	Minimum Sectional Area of Power Supply Wire
		(A)	(mm^2)	(mm^2)
ICI-12	220-240，1，50	6	1.0	1.0
ICI-18	220-240，1，50	6	1.0	1.0
ICI-24	220-240，1，50	6	1.0	1.0
ICI-36	220-240，1，50	6	1.0	1.0
ICI-45	220-240，1，50	6	1.0	1.0
ICI-50	220-240，1，50	6	1.0	1.0

MAINTENANCE

MAINTENANCE

1 TROUBLE TABLE

Trouble Code	Trouble Name	Origin of Trouble Signal	Control Description
E0	Pump Failure	Pump	If water full protection continues for 2 hours and fails to restore, it is believed that the water pump is at fault and all loads are shut off and fail to restore automatically.
E1	Compressor High Pressure Protection	High voltage switch	When high voltage protection is detected for continuous 3 seconds, all loads are shut off (except for the four way valve), all buttons and remote control signals except for power-on or power-off are shielded and fail to restore automatically, the unit should be powered off and on, or failure should be removed after power supply is restored.
E2	Indoor Frost-Proof Protection	Evaporator of indoor unit Thermal bulb	When the unit has been running for refrigeration or dehumidification for a period of time and evaporator thermal bulb is detected to be lower than -2℃, the unit will report a fault and stops the compressor and the outdoor unit. The unit will begin to operate after temperature is ≥10℃ and the compressor keeps outage for 3 minutes.
E3	Compressor Low Pressure Protection	Low voltage switch	When the unit is started or at standby (detection will begin 3 minutes after the compressor is started up) and detected breakdown of the low voltage switch for continuous 30 seconds, a fault is reported. The unit can be restored automatically after the first 2 reported faults within 30 minutes. The third reported fault and so on can not be restored automatically.
E4	Compressor Exhaust High Temperature Protection	Discharge thermal bulb	After the compressor is started, if discharge temperature is detected to be more than or equal to 130 degree for continuous 30 seconds, E4 will be displayed, all loads (except for the four way valve) will be shut off, the compressor will stop for 3 minutes and the complete system will restore after discharge temperature is lower than 90 degree. If such fault is reported for successive three times, the protection can not be restored itself.
E5	Compressor Overheat	Compressor	After the compressor is started, if the overload switch of the compressor is detected to shut off, the fault is reported. All loads (except for the four way valve) are shut off, the fault is displayed, and the compressor will stop for 3 minutes. If the fault is removed, the compressor can be restarted to run. If successive three compressor overload protection faults are detected within

Trouble Code	Trouble Name	Origin of Trouble Signal	Control Description
			30 minutes, the unit can not be restored itself and the buzzer will give out an alarm. Push the ON/OFF button to shut off the unit. And then push ON/OFF button again, if high voltage protection disappears, operation will restore, or otherwise, the fault is displayed.
E6	Communications Failure	Communication	When outdoor unit is energized and fails to receive data of indoor unit within 30 seconds, an indoor unit communication fault is reported. The compressor and the outdoor unit will be shut off, and the four way valve will be stopped 2 minutes after the compressor outage in heating state. If indoor unit fails to receive information of outdoor unit, a communication fault is reported. The indoor unit is shut off and an indicator is twinkling. If the display board fails to receive information of outdoor unit, a communication fault is determined and displayed and the unit does not actuate. After communication becomes normal, the system can restore to the previous running state itself.
E8	Indoor Fan Protection	Indoor unit	If fan overload protection is detected for continuous 3 seconds, relevant compressor and fan shall be shut off immediately and a fault code E8 is displayed, and at the same time, the buzzer gives out an alarm. Push the ON/OFF key, if the fault disappears, clear the fault display and push the ON/OFF key for restarting the system.
E9	Full Water Protection	Liquid level switch	Water full is detected for continuous 8 seconds after the system is powered on, the water full protection is initiated and the indicator is twinkling (or E9 is displayed). Under refrigeration and dehumidification mode, the outdoor fan and the compressor are shut off and the indoor fan stops after 1 minute delay; under heating mode, he outdoor fan and the compressor are shut off, the four way valve keeps at the previous status, and the indoor fan stops after 1 minute delay; under air supply mode, the load of indoor unit remains.
F0	Failure of Indoor Room Sensor at Air Intake	Indoor environment Thermal bulb	Open-circuit or short-circuit of the indoor environment thermal bulb is detected for continuous 5 seconds, indoor environment temperature will be set compulsively at 24 degree, the system does not take any measure, and only the indicator is twinkling or fault code F0 is displayed. After the fault is removed, the system can restore operation by itself. Under air supply mode, only the

Trouble Code	Trouble Name	Origin of Trouble Signal	Control Description
			fault is displayed and the indoor fan is running normally. The fault display disappears when the fault is removed.
F1	Failure of Evaporator Temp. Sensor	Indoor evaporator thermal bulb	Open-circuit or short-circuit of evaporator thermal bulb is detected for continuous 5 seconds, under refrigeration and dehumidification mode, the system will be shut off; and under heating mode, all loads except for the four way valve are shut off. The indicator is twinkling or fault code F1 is displayed. The system can restore by itself and display fault elimination after the fault is removed. Under air supply mode, only the fault is displayed and the indoor unit is running normally. The fault display disappears when the fault is removed.
F2	Failure of Condenser Temp. Sensor	Outdoor condenser thermal bulb	Open-circuit or short-circuit of condenser thermal bulb is detected for continuous 5 seconds, under refrigeration and dehumidification mode, the system will be shut off; and under heating mode, all loads except for the four way valve are shut off. The indicator is twinkling or fault code F2 is displayed. The system can restore by itself and display fault elimination after the fault is removed. Under air supply mode, only the fault is displayed and the indoor unit is running normally. The fault display disappears when the fault is removed. For other types of refrigeration machines except for air duct machine, condenser thermal bulb is not detected.
F3	Failure of Outdoor Ambient Sensor	Outdoor environment thermal bulb	Open-circuit or short-circuit of outdoor environment thermal bulb is detected for continuous 5 seconds, under refrigeration and dehumidification mode, the system will be shut off; and under heating mode, all loads except for the four way valve are shut off. The indicator is twinkling or fault code F3 is displayed. The system can restore by itself and display fault elimination after the fault is removed. Under air supply mode, only the fault is displayed and the indoor unit is running normally. The fault display disappears when the fault is removed.
F4	Failure of Exhaust Temp. Sensor	Discharge thermal bulb	After the compressor is started, open-circuit of discharge thermal bulb is detected for continuous 5 seconds. Under refrigeration and dehumidification mode, all loads will be shut off. Under heating mode, all loads except for the four way valve are shut off. The indicator is twinkling or fault code F4 is displayed. And the buzzer gives out an alarm. After the fault is removed, the system will restore by itself and clear the fault code.

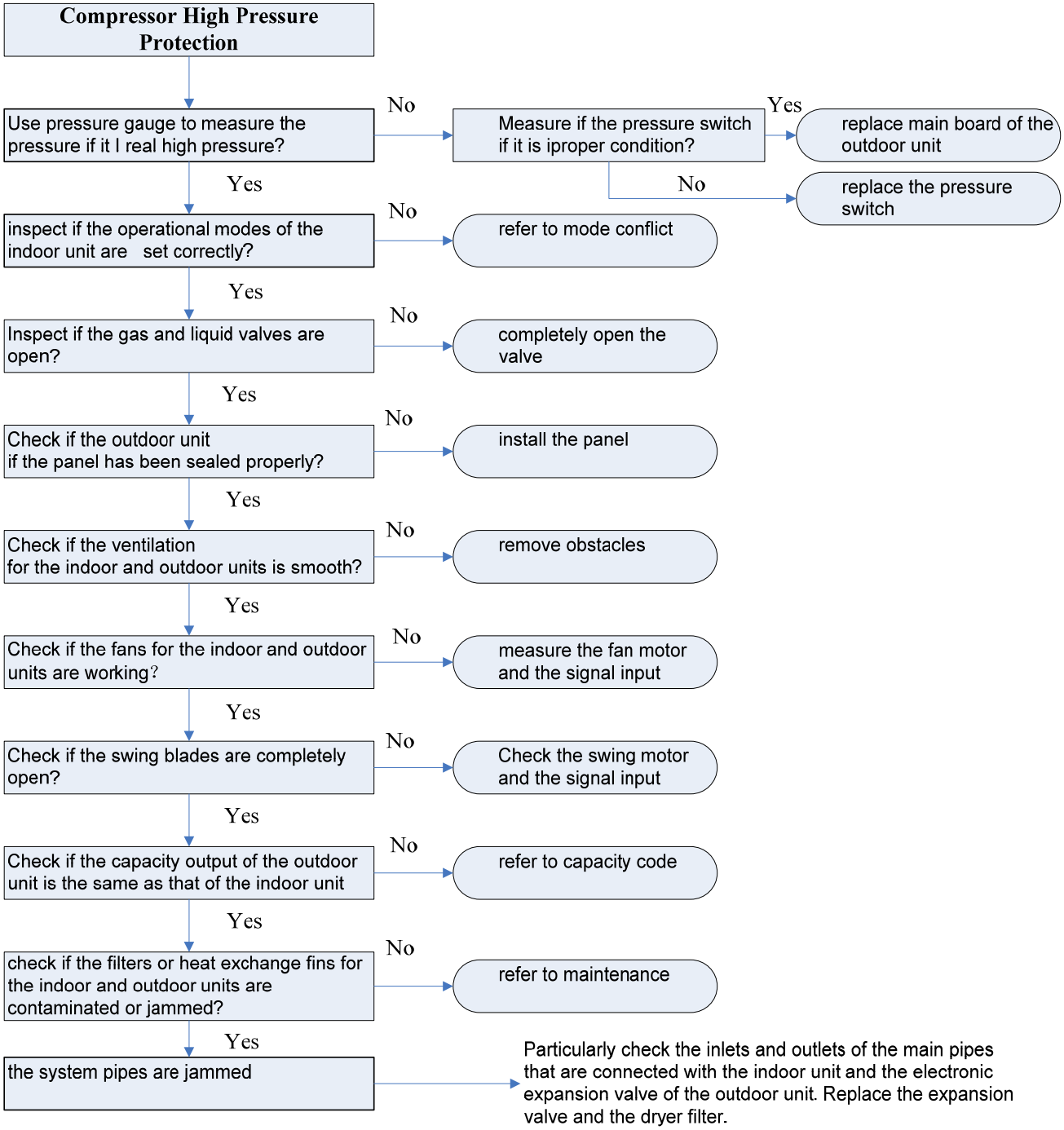
Trouble Code	Trouble Name	Origin of Trouble Signal	Control Description
			If discharge thermal bulb is short circuited, under refrigeration and dehumidification mode, all loads will be shut off. Under heating mode, all loads except for the four way valve are shut off. The indicator is twinkling or fault code F4 is displayed. And the buzzer gives out an alarm. After the fault is removed, the system will restore by itself and clear the fault code.
F5	Failure of Indoor Room Sensor at Wire Controller	Line controller	Open-circuit or short-circuit of line controller thermal bulb is detected for continuous 5 seconds, indoor environment temperature will be set compulsively at 24 degree, the system does not take any measure, and only the indicator is twinkling or fault code F0 is displayed. After the fault is removed, the system can restore operation by itself. Under air supply mode, only the fault is displayed and the indoor fan is running normally. The fault display disappears when the fault is removed.

2 FLOW CHART OF TROUBLESHOOTING

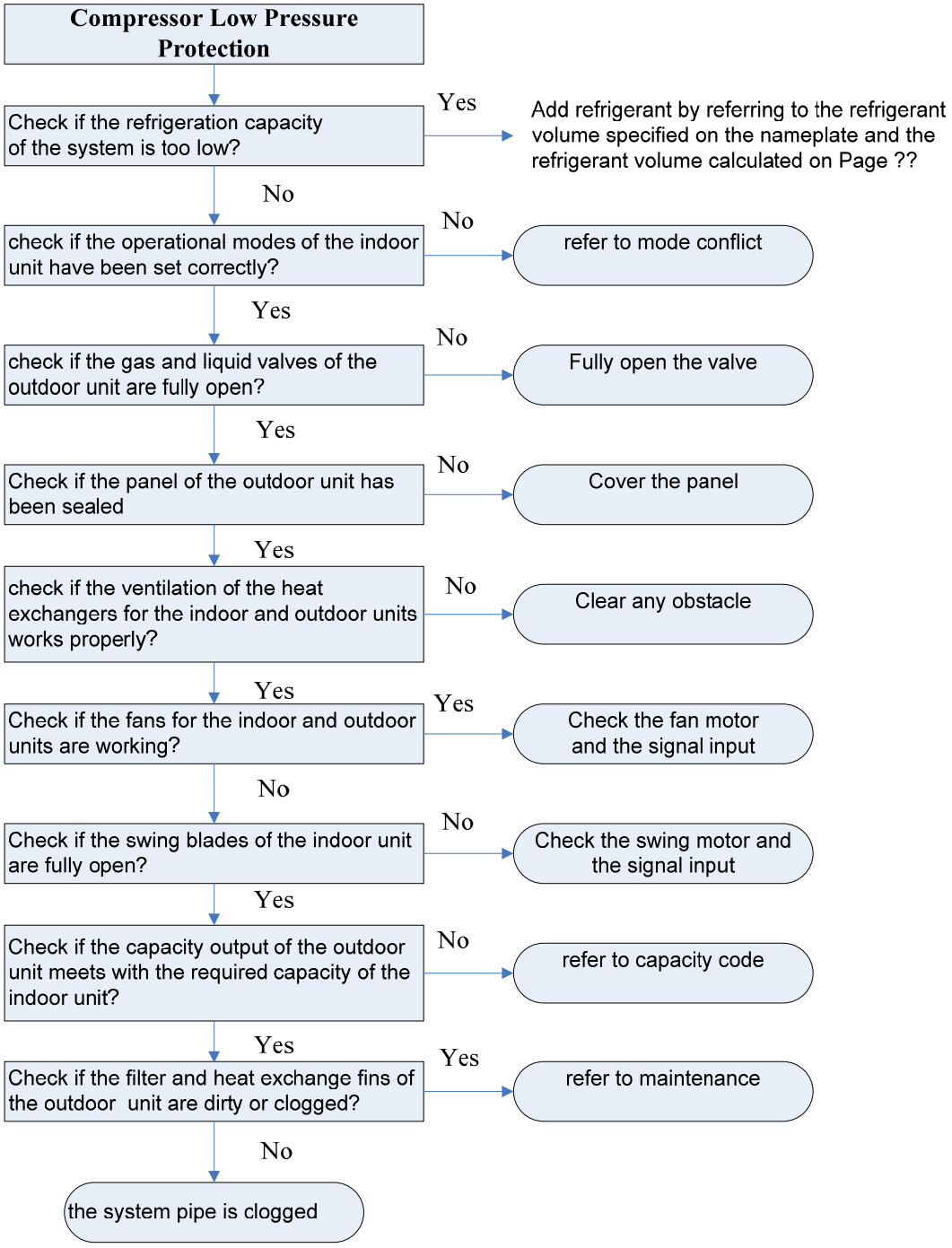
Service personnel shall collect the malfunction information as much as possible and research them thoroughly, list these electrical parts which may cause malfunction, service personnel shall be able to determine the specific reason and solve the faulted parts.

- Observe the status of the complete device and do not observe the partial
- It is advised to start from the simple operation during analyzing ,judging and confirming malfunction reason, then conduct the complicated operations such removal of device, part replacement and refrigerant filling.
- Find the malfunction reason carefully as unit may occur several malfunction at the same time and one malfunction may develop into several malfunction, so entire system analysis shall be established to make the judged result exact and credible .

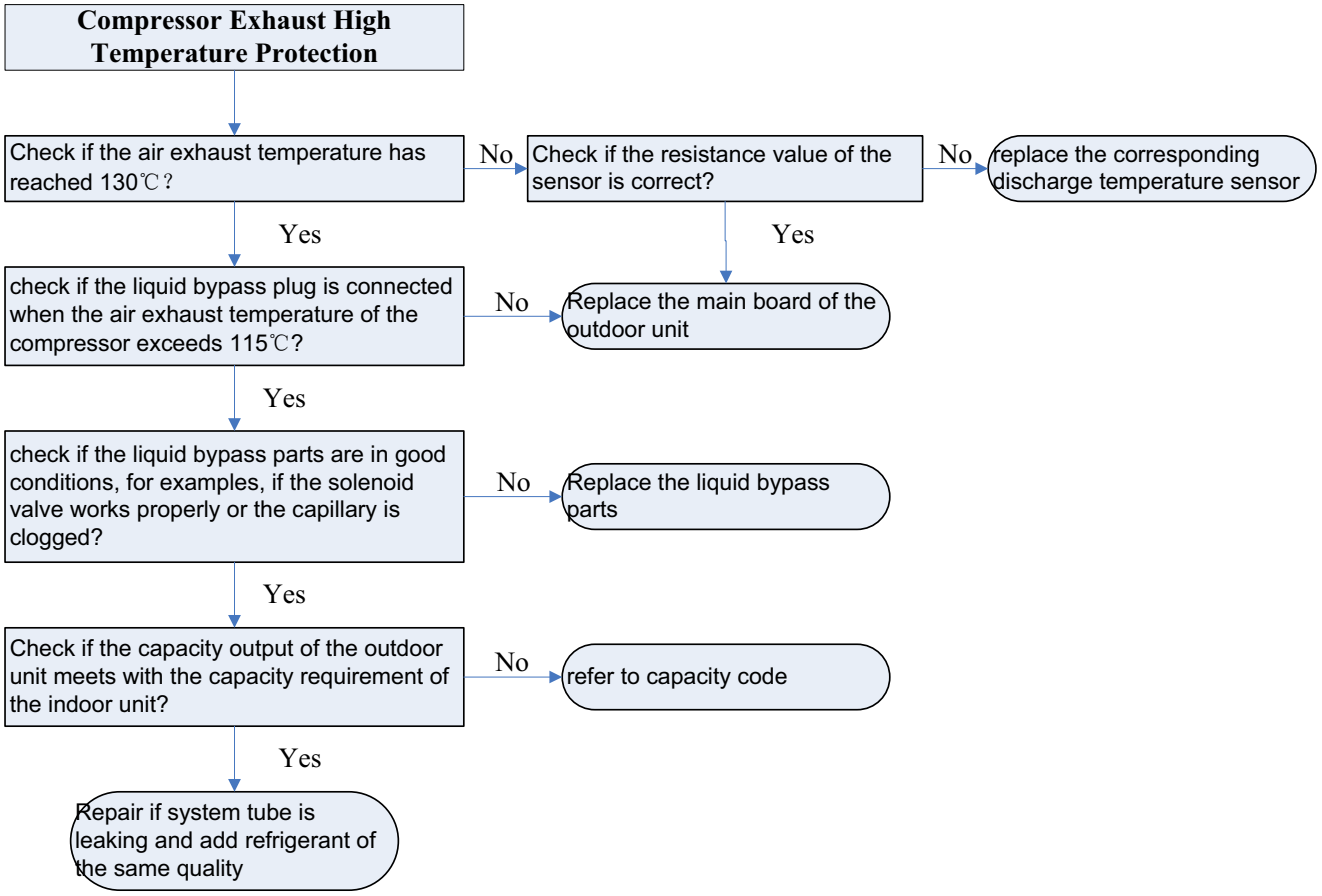
◆ Malfunction display: E1 Compressor High Pressure Protection


Compressor High Pressure Protection
Use pressure gauge to measure the pressure if it I real high pressure?
No
Measure if the pressure switch if it is iproper condition?
Yes
replace main board of the outdoor unit
No
replace the pressure switch
Yes
inspect if the operational modes of the indoor unit are set correctly?
No
refer to mode conflict
Yes
Inspect if the gas and liquid valves are open?
No
completely open the valve
Yes
Check if the outdoor unit if the panel has been sealed properly?
No
install the panel
Yes
Check if the ventilation for the indoor and outdoor units is smooth?
No
remove obstacles
Yes
Check if the fans for the indoor and outdoor units are working?
No
measure the fan motor and the signal input
Yes
Check if the swing blades are completely open?
No
Check the swing motor and the signal input
Yes
Check if the capacity output of the outdoor unit is the same as that of the indoor unit
No
refer to capacity code
Yes
check if the filters or heat exchange fins for the indoor and outdoor units are contaminated or jammed?
No
refer to maintenance
Yes
the system pipes are jammed
Particularly check the inlets and outlets of the main pipes that are connected with the indoor unit and the electronic expansion valve of the outdoor unit. Replace the expansion valve and the dryer filter.

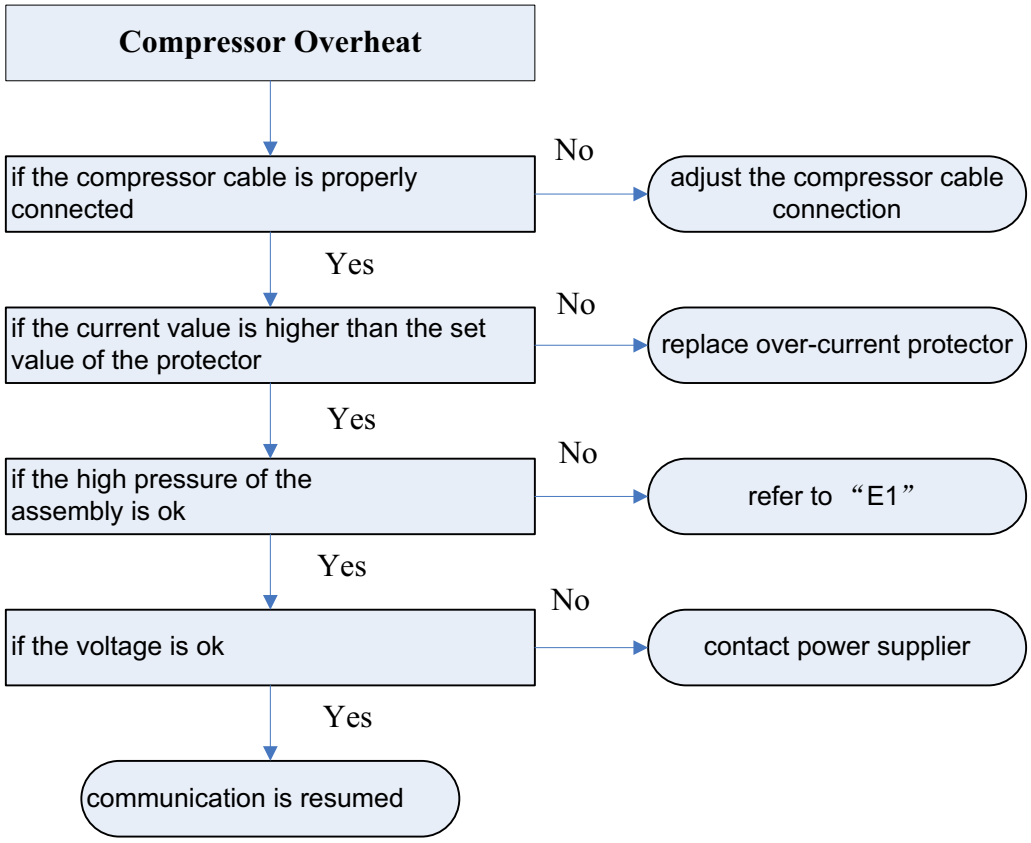
◆ Malfunction display: E3 Compressor Low Pressure Protection


Compressor Low Pressure Protection
Check if the refrigeration capacity of the system is too low?
Yes
Add refrigerant by referring to the refrigerant volume specified on the nameplate and the refrigerant volume calculated on Page ??
No
check if the operational modes of the indoor unit have been set correctly?
No
refer to mode conflict
Yes
check if the gas and liquid valves of the outdoor unit are fully open?
No
Fully open the valve
Yes
Check if the panel of the outdoor unit has been sealed
No
Cover the panel
Yes
check if the ventilation of the heat exchangers for the indoor and outdoor units works properly?
No
Clear any obstacle
Yes
Check if the fans for the indoor and outdoor units are working?
Yes
Check the fan motor and the signal input
No
Check if the swing blades of the indoor unit are fully open?
No
Check the swing motor and the signal input
Yes
Check if the capacity output of the outdoor unit meets with the required capacity of the indoor unit?
No
refer to capacity code
Yes
Check if the filter and heat exchange fins of the outdoor unit are dirty or clogged?
Yes
refer to maintenance
No
the system pipe is clogged

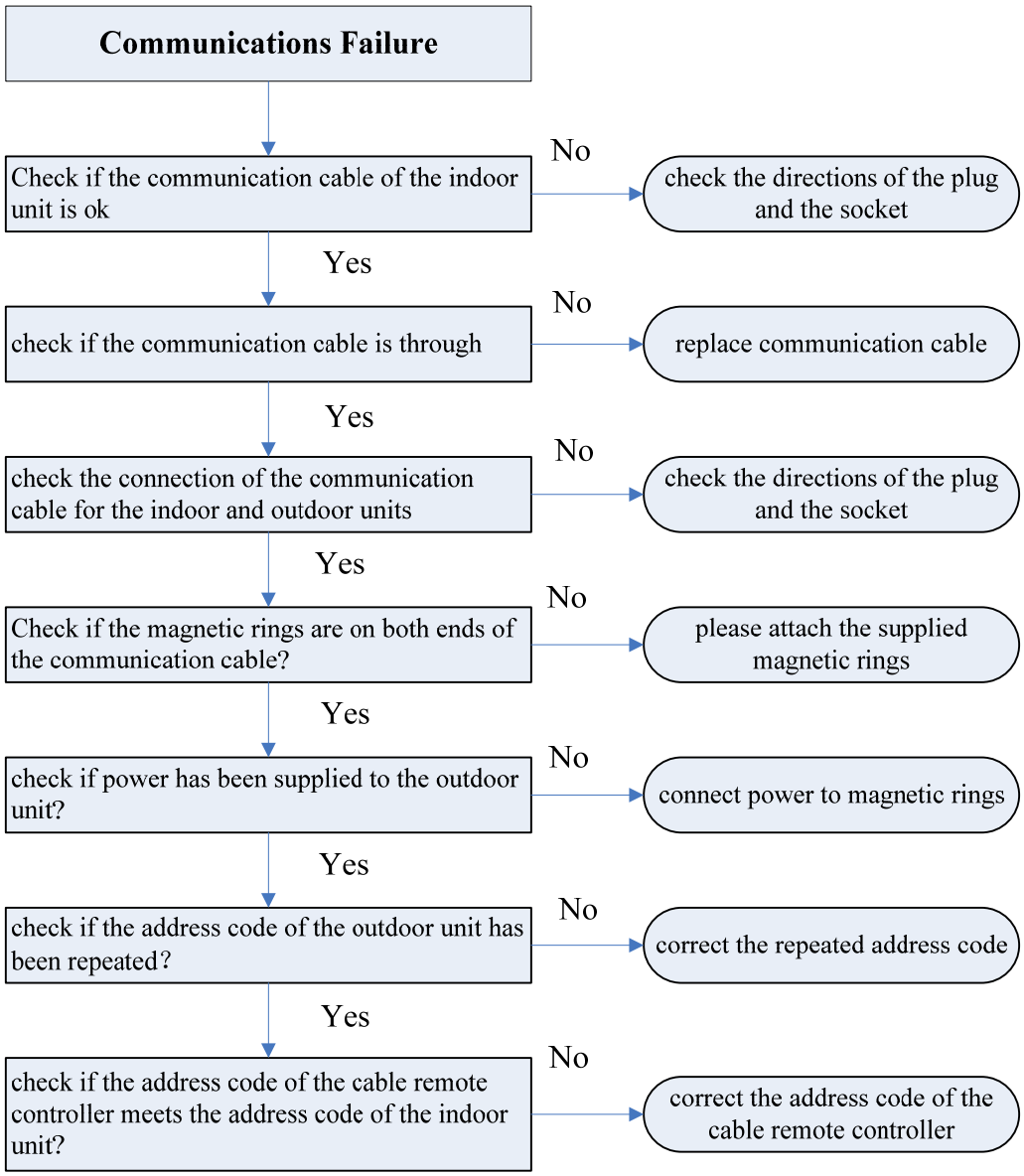
◆ Malfunction display: E4 Compressor Exhaust High Temperature Protection


Compressor Exhaust High Temperature Protection
Check if the air exhaust temperature has reached 130℃?
No
Check if the resistance value of the sensor is correct?
No
replace the corresponding discharge temperature sensor
Yes
Yes
check if the liquid bypass plug is connected when the air exhaust temperature of the compressor exceeds 115℃?
No
Replace the main board of the outdoor unit
Yes
check if the liquid bypass parts are in good conditions, for examples, if the solenoid valve works properly or the capillary is clogged?
No
Replace the liquid bypass parts
Yes
Check if the capacity output of the outdoor unit meets with the capacity requirement of the indoor unit?
No
refer to capacity code
Yes
Repair if system tube is leaking and add refrigerant of the same quality

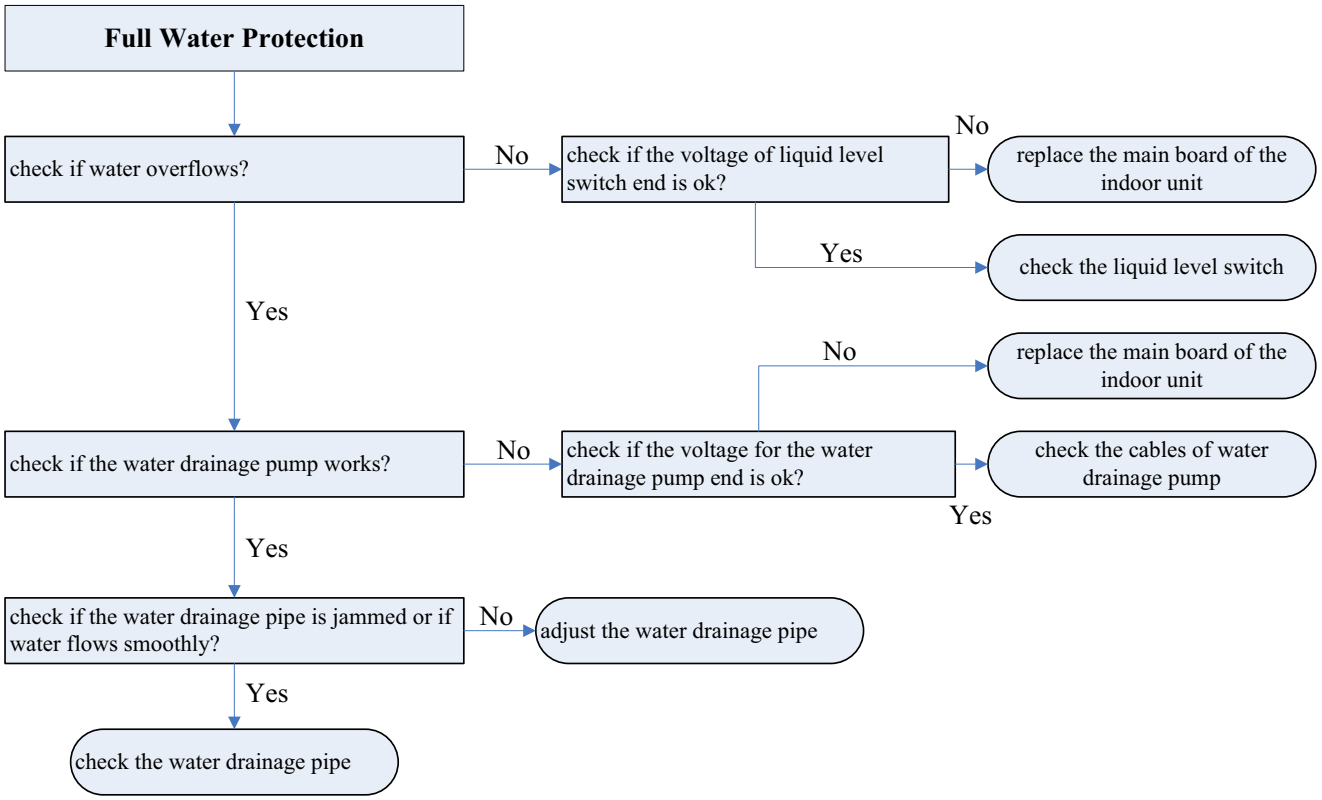
◆ Malfunction display: E5 Compressor Overheat



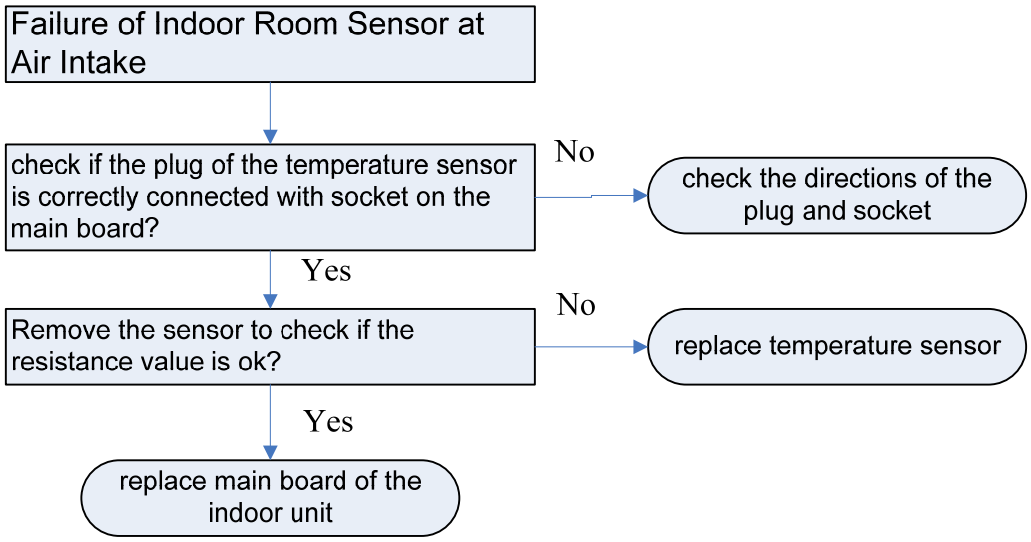
◆ Malfunction display: E6 Communications Failure


Communications Failure
Check if the communication cable of the indoor unit is ok
No
check the directions of the plug and the socket
Yes
check if the communication cable is through
No
replace communication cable
Yes
check the connection of the communication cable for the indoor and outdoor units
No
check the directions of the plug and the socket
Yes
Check if the magnetic rings are on both ends of the communication cable?
No
please attach the supplied magnetic rings
Yes
check if power has been supplied to the outdoor unit?
No
connect power to magnetic rings
Yes
check if the address code of the outdoor unit has been repeated?
No
correct the repeated address code
Yes
check if the address code of the cable remote controller meets the address code of the indoor unit?
No
correct the address code of the cable remote controller

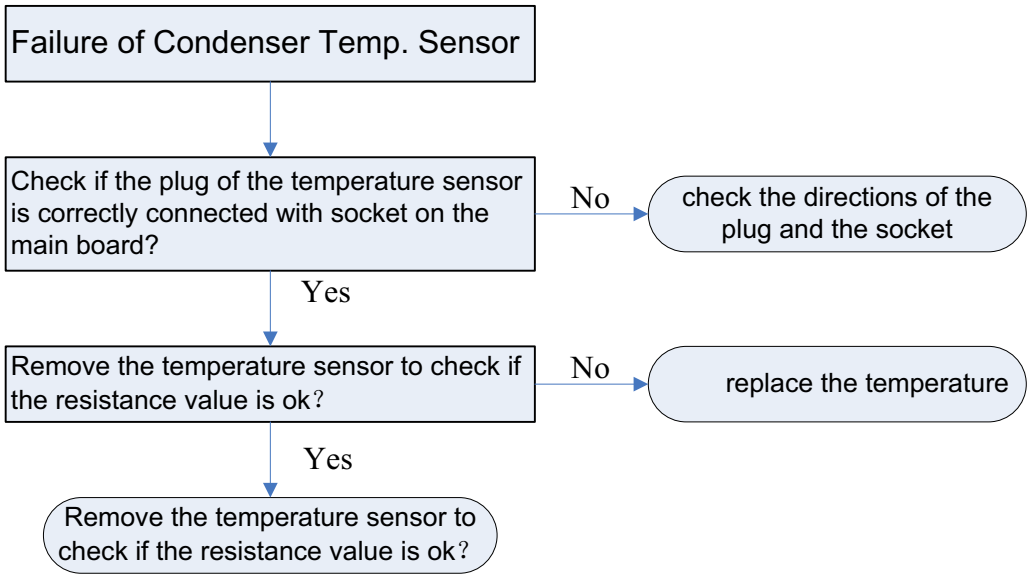
◆ Malfunction display: E9 Full Water Protection


Full Water Protection
check if water overflows?
No
check if the voltage of liquid level switch end is ok?
No
replace the main board of the indoor unit
Yes
check the liquid level switch
Yes
check if the water drainage pump works?
No
check if the voltage for the water drainage pump end is ok?
No
replace the main board of the indoor unit
check the cables of water drainage pump
Yes
Yes
check if the water drainage pipe is jammed or if water flows smoothly?
No
adjust the water drainage pipe
Yes
check the water drainage pipe

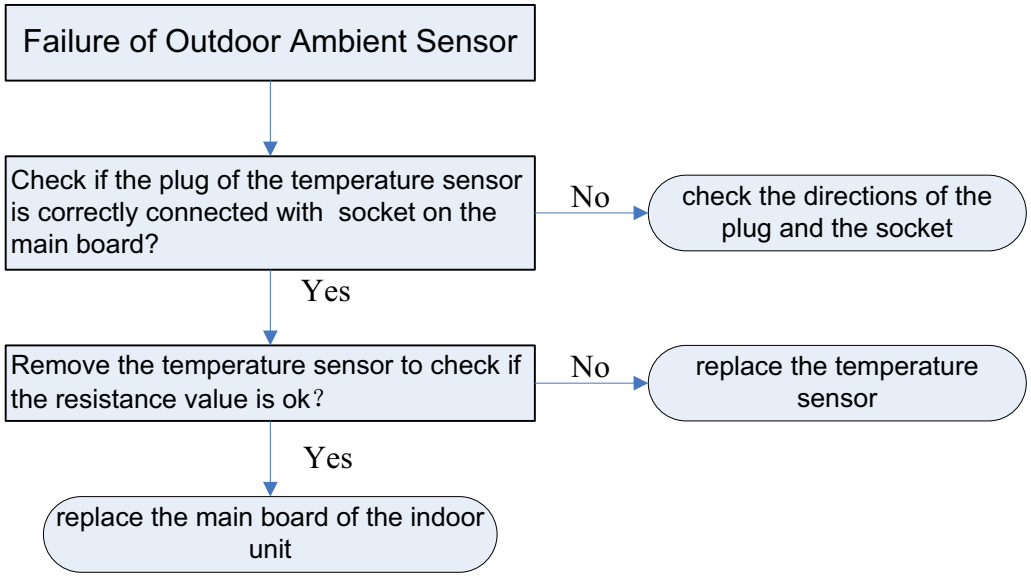
◆ Malfunction display: F0 Failure of Indoor Room Sensor at Air Intake


Failure of Indoor Room Sensor at Air Intake
check if the plug of the temperature sensor is correctly connected with socket on the main board?
No
check the directions of the plug and socket
Yes
Remove the sensor to check if the resistance value is ok?
No
replace temperature sensor
Yes
replace main board of the indoor unit

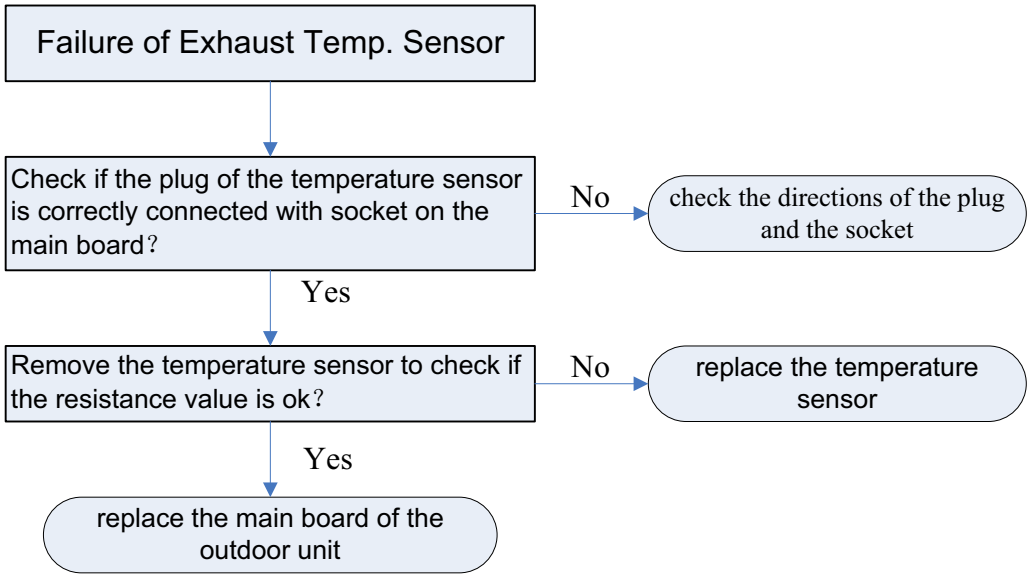
◆ Malfunction display: F1 Failure of Evaporator Temp. Sensor


Failure of Condenser Temp. Sensor
Check if the plug of the temperature sensor is correctly connected with socket on the main board?
No
check the directions of the plug and the socket
Yes
Remove the temperature sensor to check if the resistance value is ok?
No
replace the temperature
Yes
Remove the temperature sensor to check if the resistance value is ok?

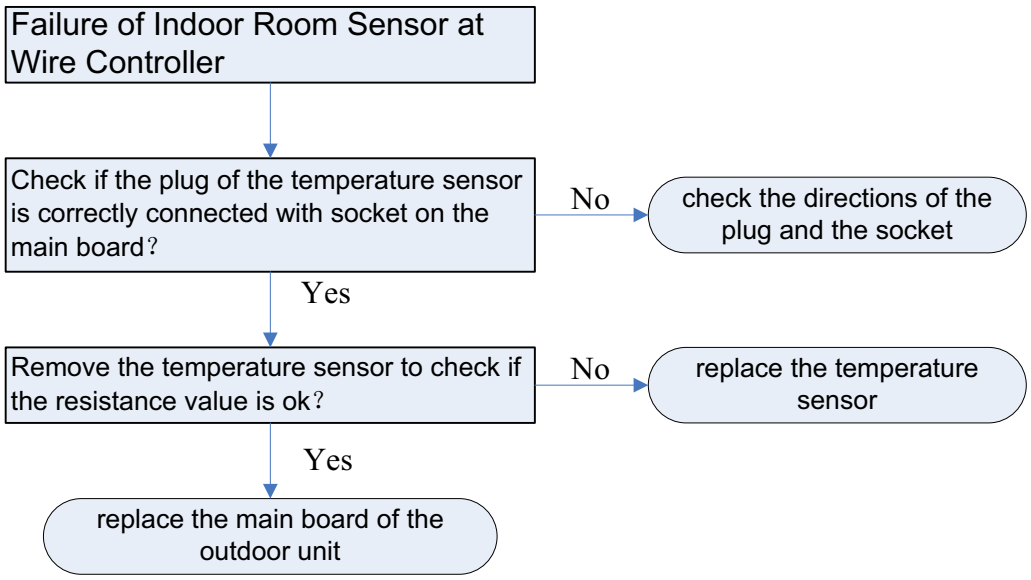
◆ Malfunction display: F3 Failure of Outdoor Ambient Sensor


Failure of Outdoor Ambient Sensor
Check if the plug of the temperature sensor is correctly connected with socket on the main board?
No
check the directions of the plug and the socket
Yes
Remove the temperature sensor to check if the resistance value is ok?
No
replace the temperature sensor
Yes
replace the main board of the indoor unit

◆ Malfunction display: F4 Failure of Exhaust Temp. Sensor


Failure of Exhaust Temp. Sensor
Check if the plug of the temperature sensor is correctly connected with socket on the main board?
No
check the directions of the plug and the socket
Yes
Remove the temperature sensor to check if the resistance value is ok?
No
replace the temperature sensor
Yes
replace the main board of the outdoor unit

◆ Malfunction display: F5 Failure of Indoor Room Sensor at Wire Controller

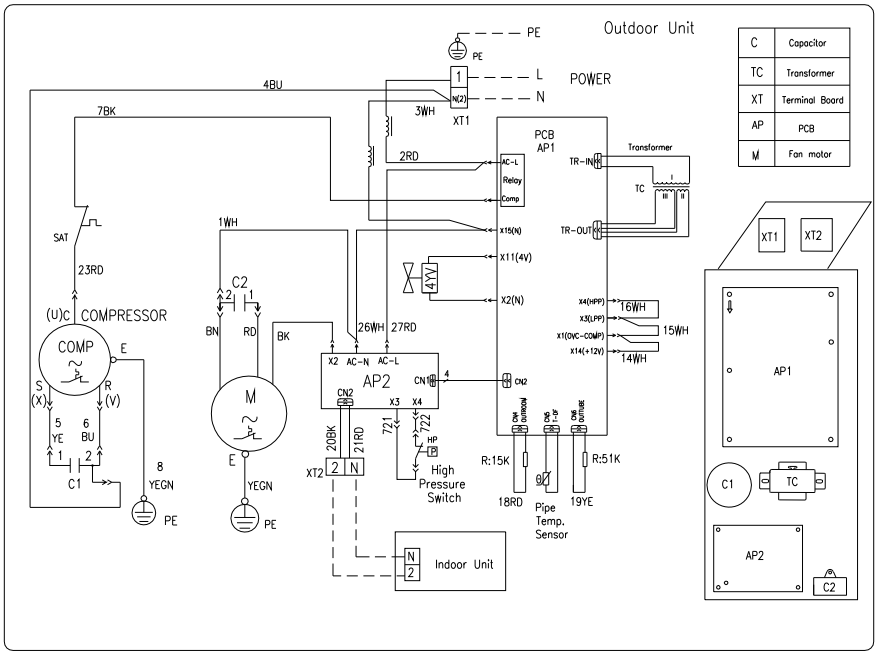

Failure of Indoor Room Sensor at Wire Controller
Check if the plug of the temperature sensor is correctly connected with socket on the main board?
No
check the directions of the plug and the socket
Yes
Remove the temperature sensor to check if the resistance value is ok?
No
replace the temperature sensor
Yes
replace the main board of the outdoor unit

3 WIRING DIADRAM

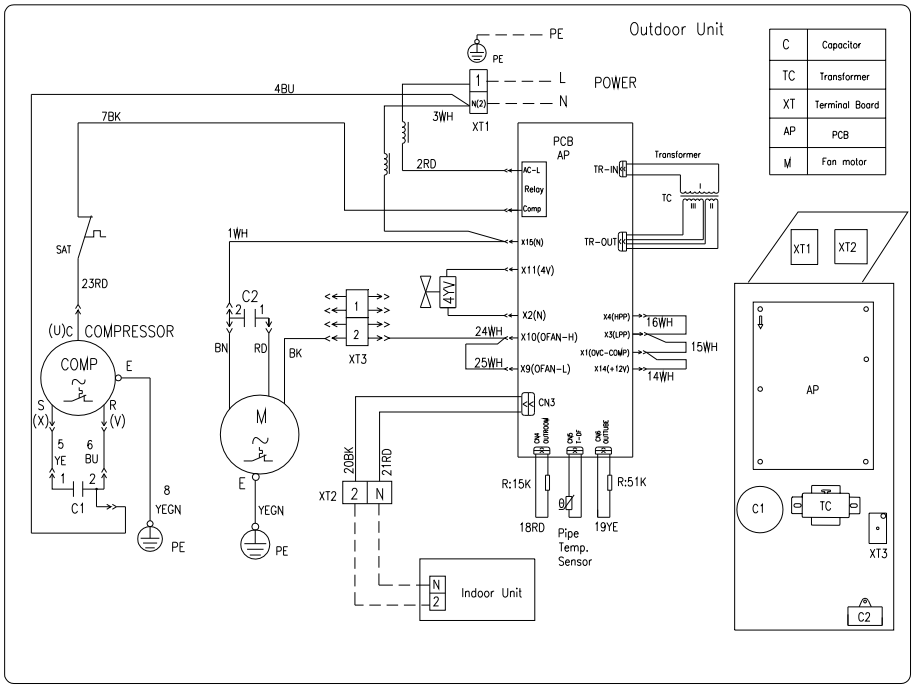
3.1 Wiring Diagram-Outdoor Units

1, **ULS-09**

WITH FUNCTION OF LOW TEMP. COOLING:

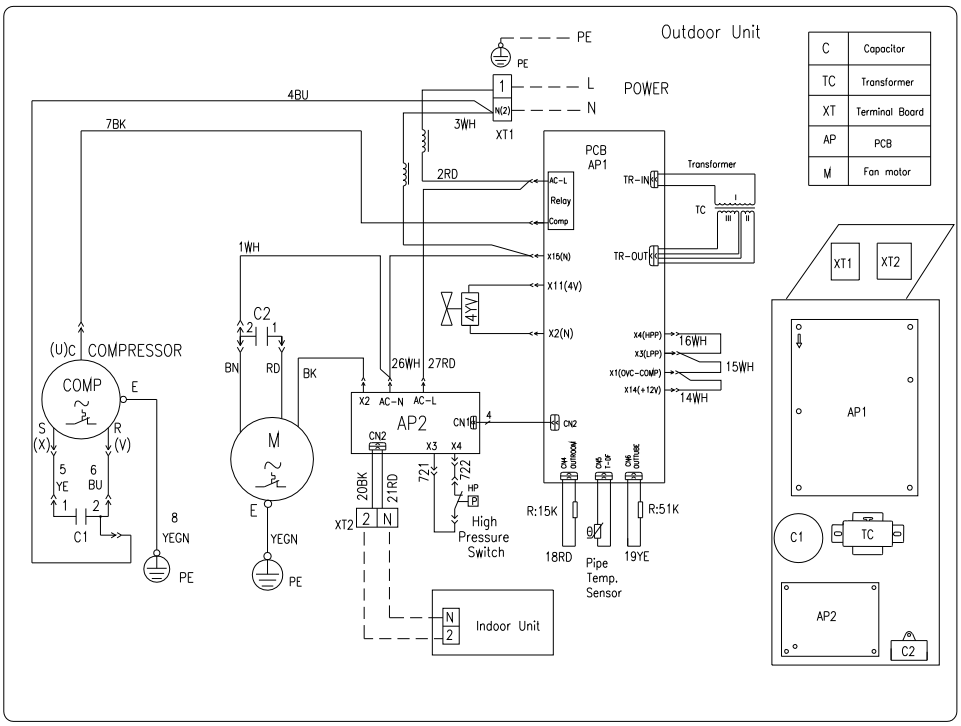


WITHOUT FUNCTION OF LOW TEMP. COOLING:

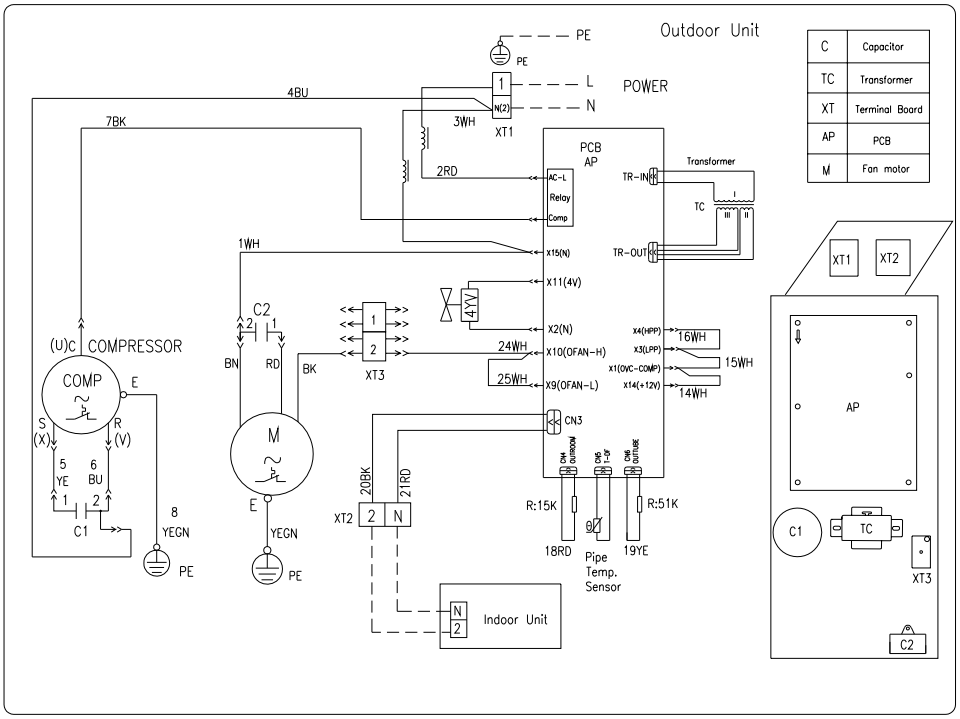


2, ULS-12

WITH FUNCTION OF LOW TEMP. COOLING:

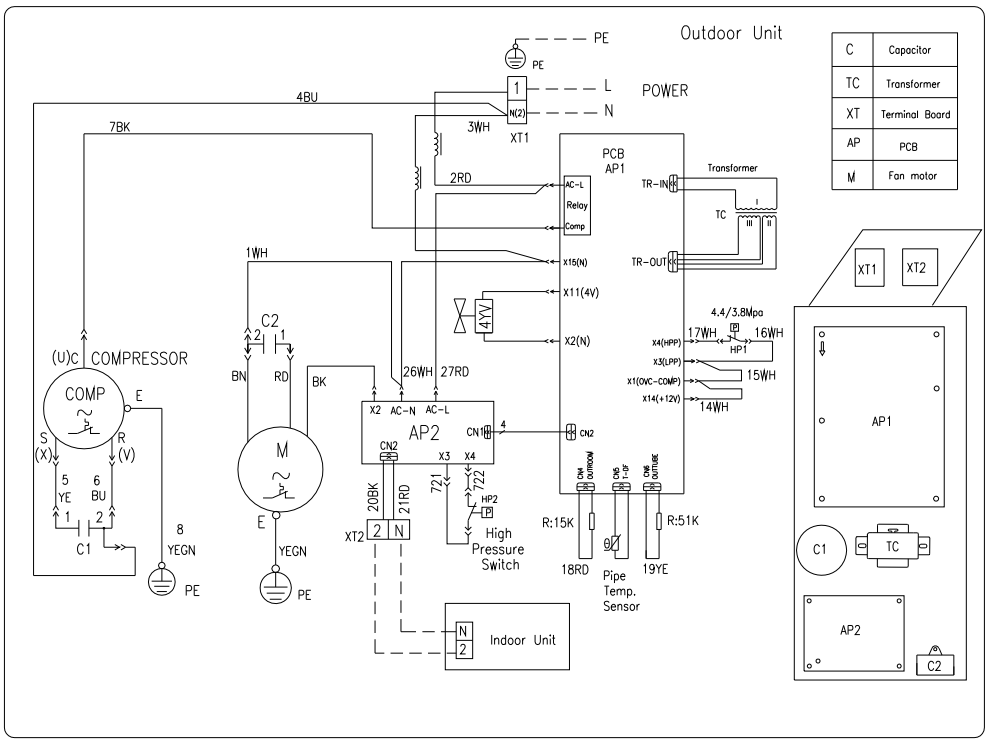


WITHOUT FUNCTION OF LOW TEMP. COOLING:

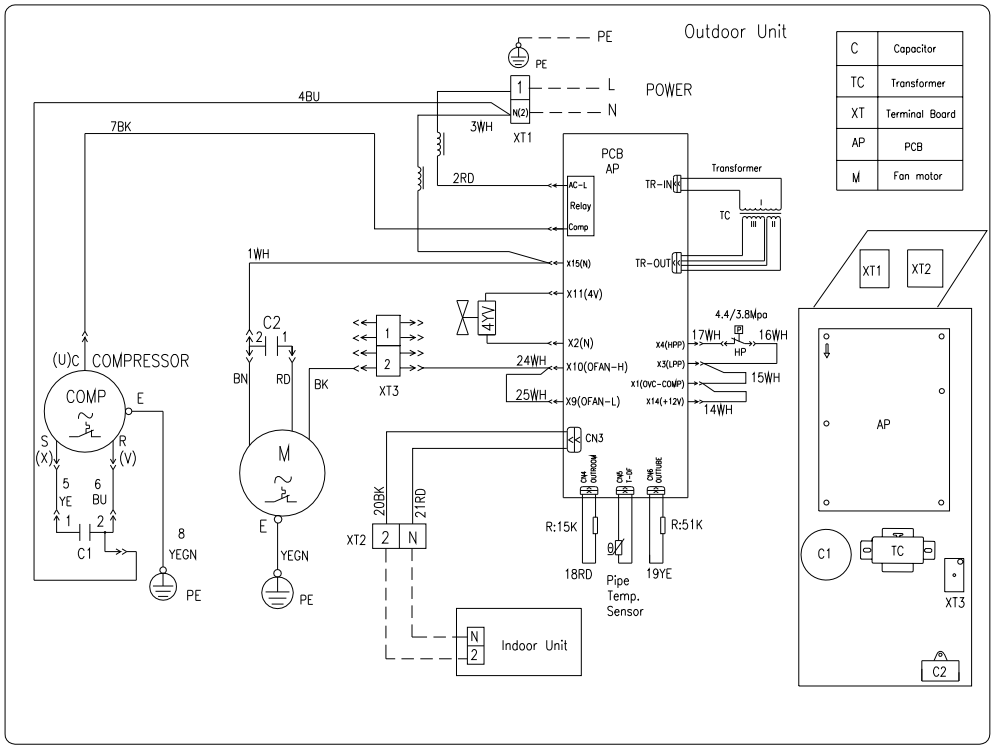


3, ULS-18

WITH FUNCTION OF LOW TEMP. COOLING:

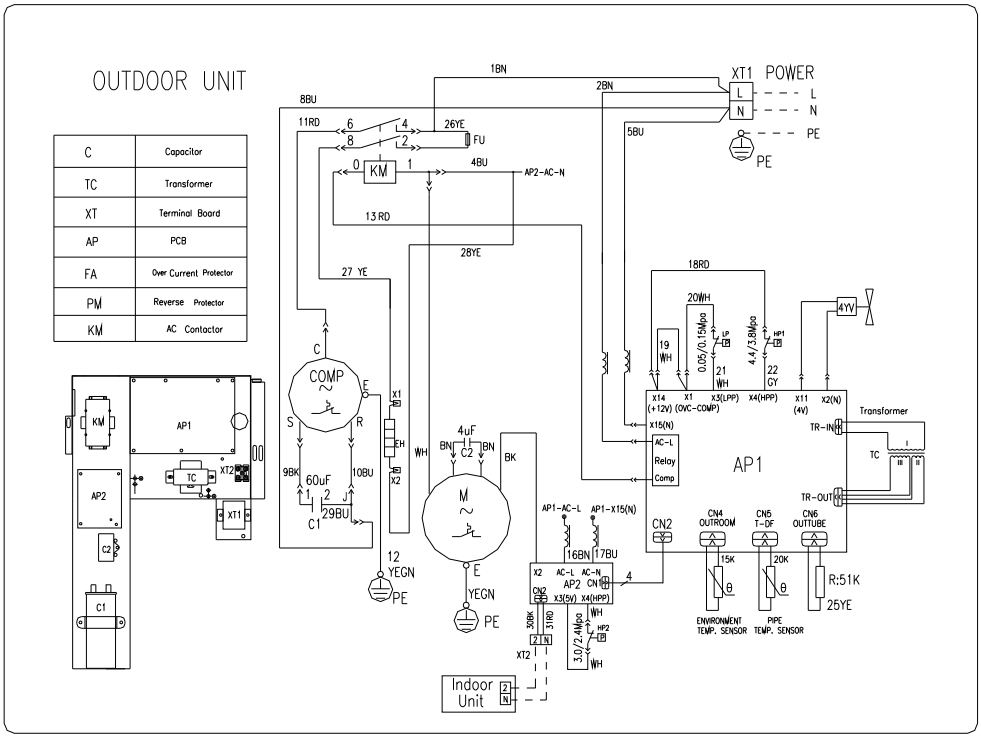


WITHOUT FUNCTION OF LOW TEMP. COOLING:

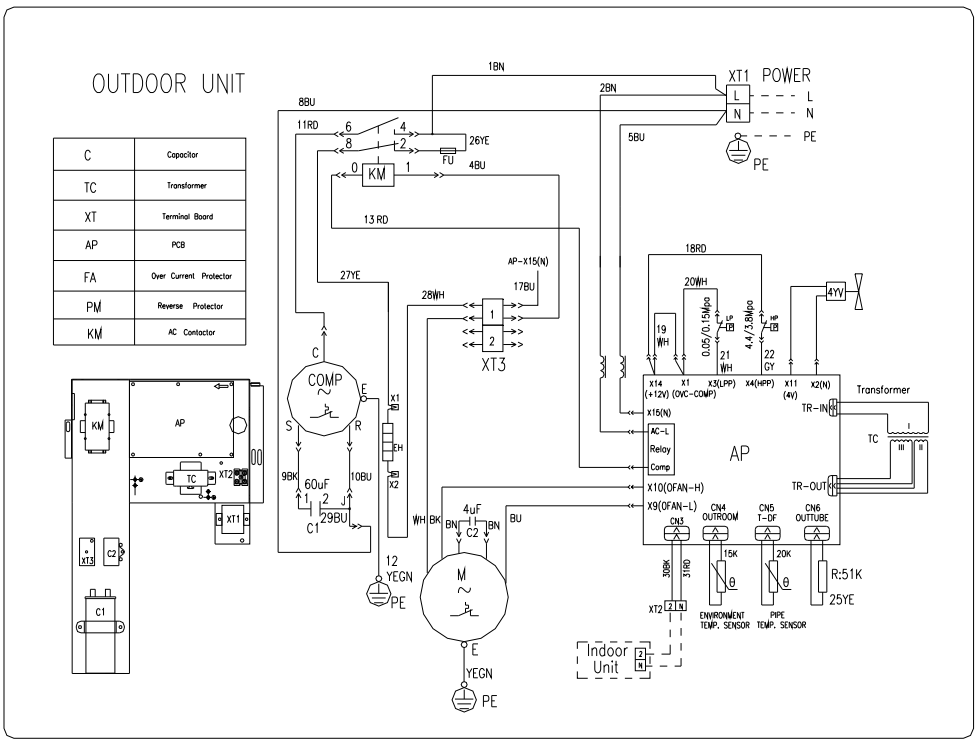


4, ULS-24

WITH FUNCTION OF LOW TEMP. COOLING:

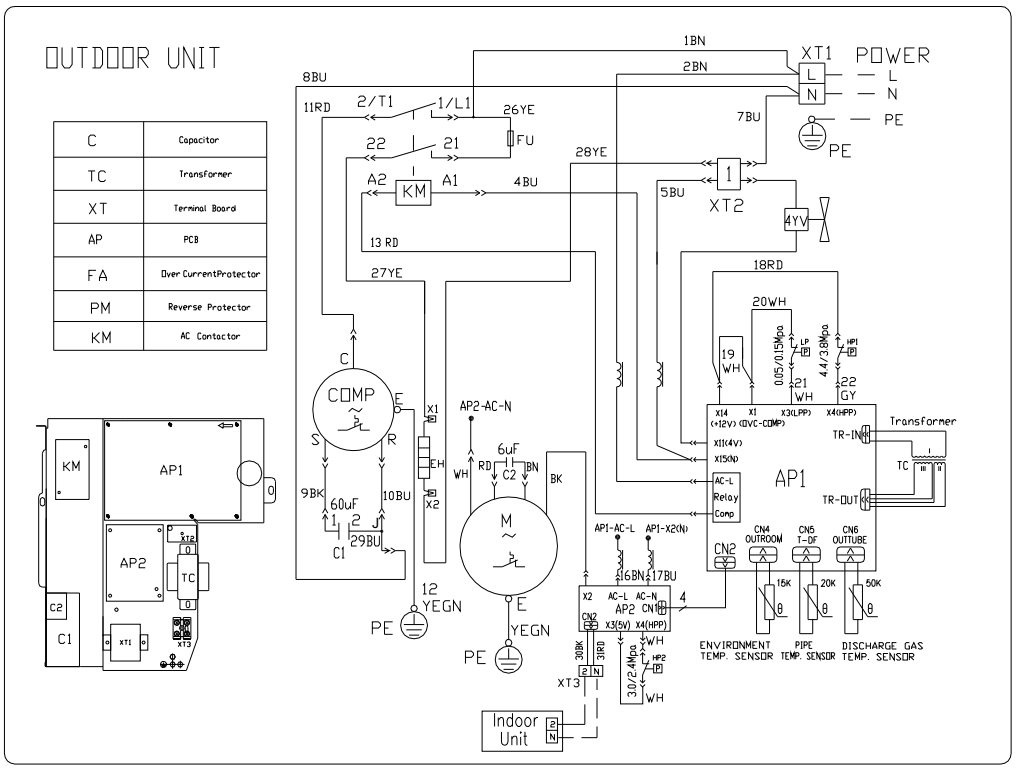


WITHOUT FUNCTION OF LOW TEMP. COOLING:

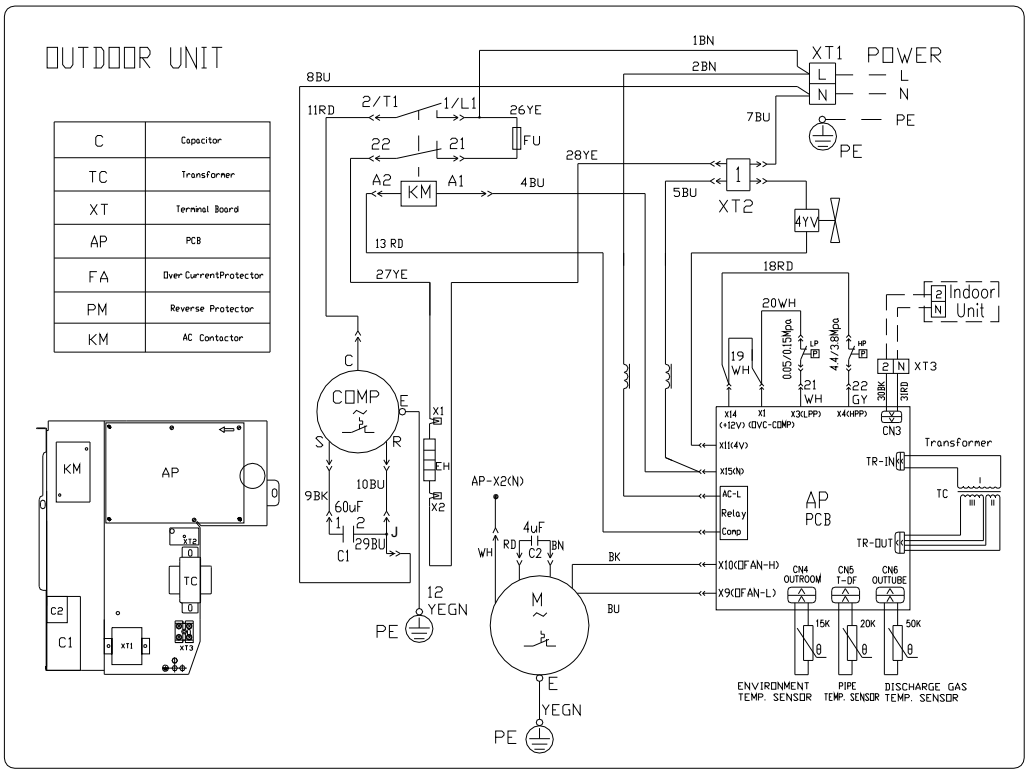


5, ULS-36

WITH FUNCTION OF LOW TEMP. COOLING:

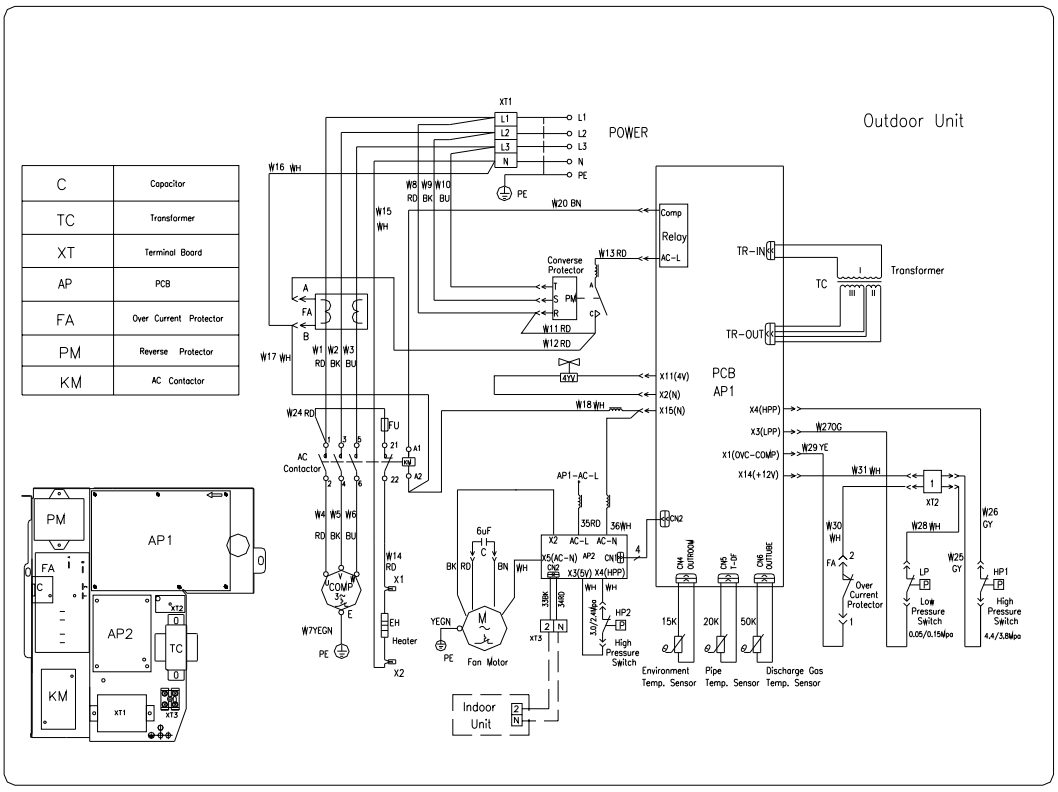


WITHOUT FUNCTION OF LOW TEMP. COOLING:

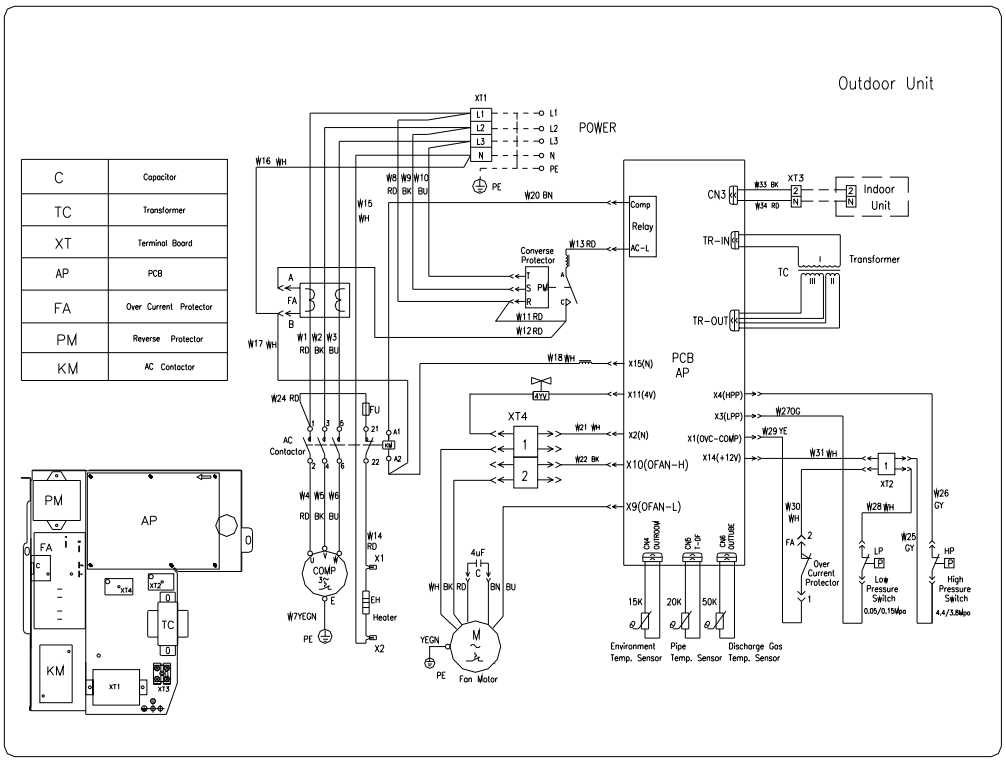


6, ULT36

WITH FUNCTION OF LOW TEMP. COOLING:

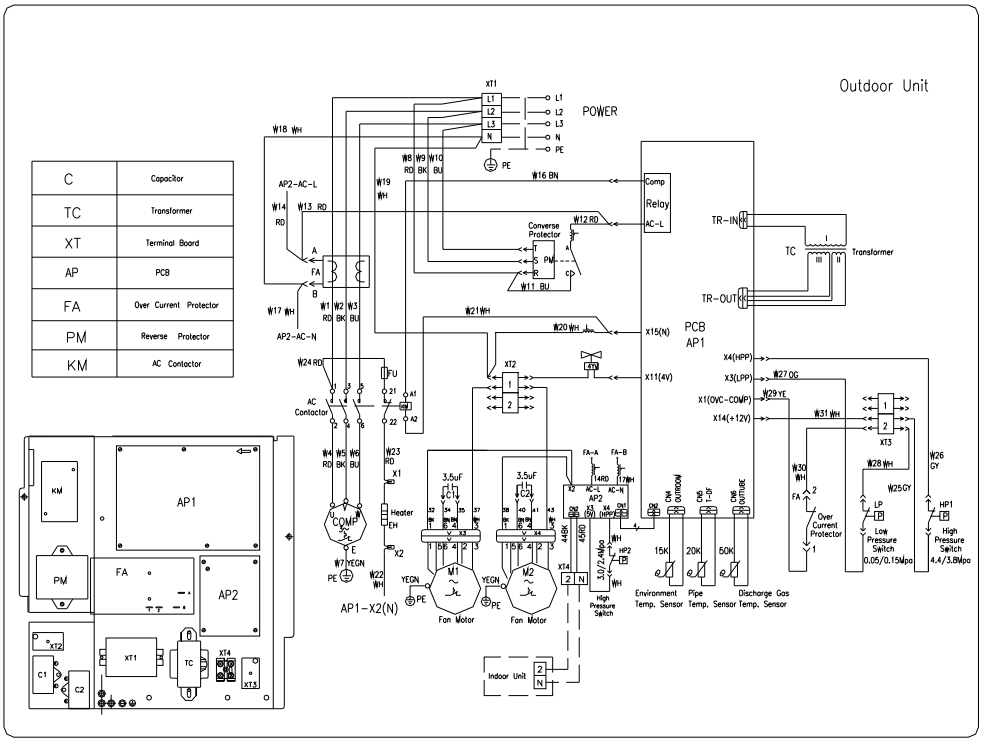


WITHOUT FUNCTION OF LOW TEMP. COOLING:

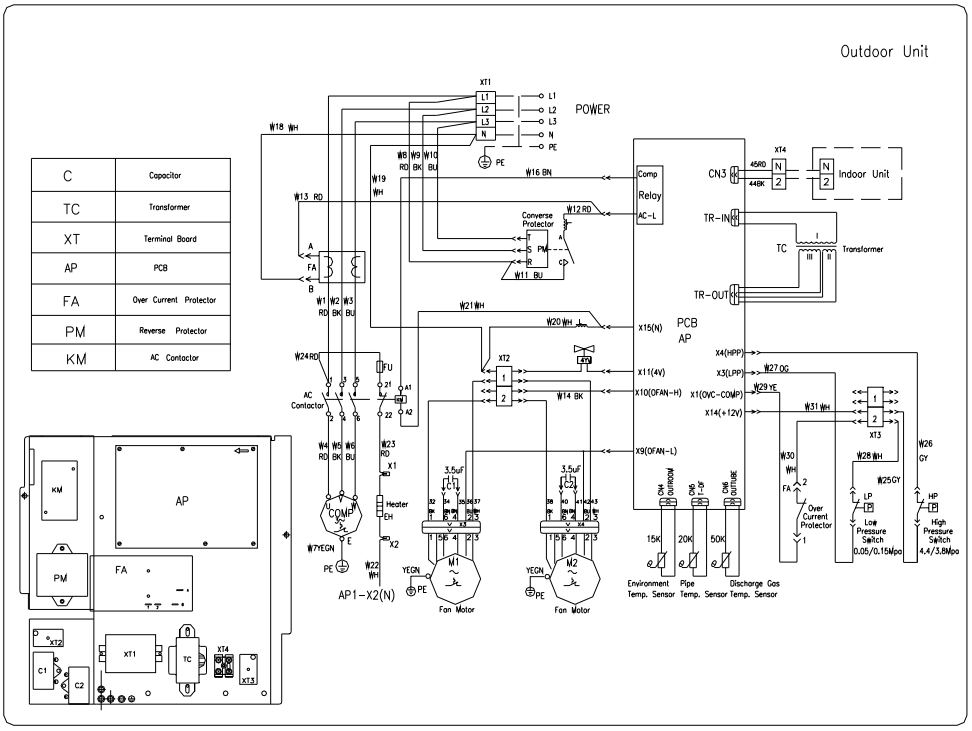


7, ULT-45

WITH FUNCTION OF LOW TEMP. COOLING:

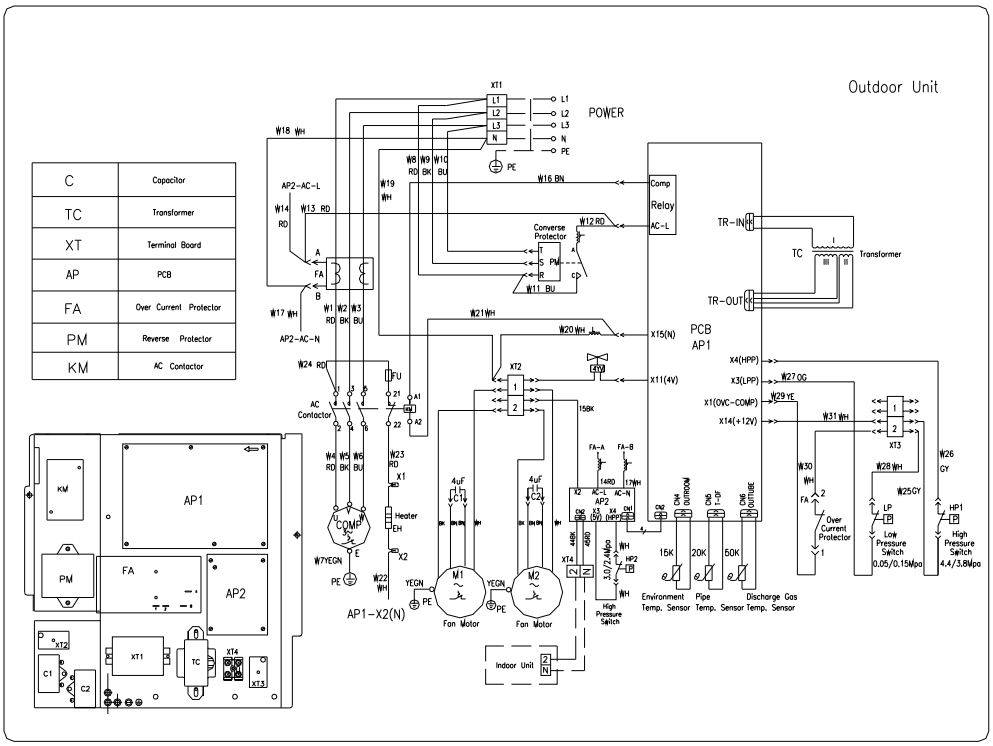


WITHOUT FUNCTION OF LOW TEMP. COOLING:

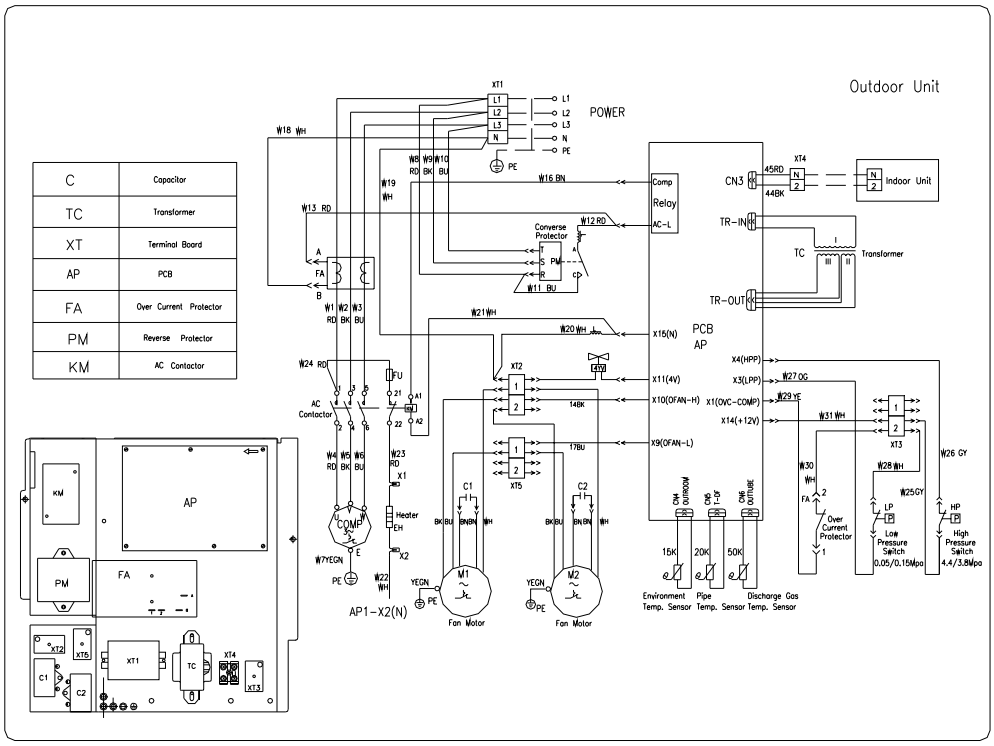


8, ULT-50；ULT-60

WITH FUNCTION OF LOW TEMP. COOLING:



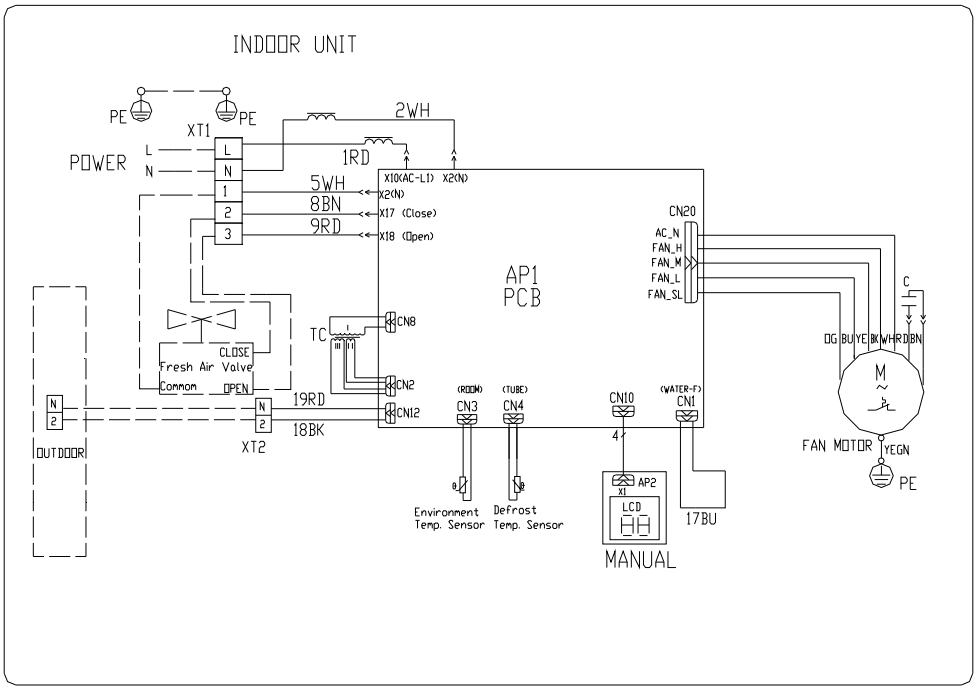
WITHOUT FUNCTION OF LOW TEMP. COOLING:



3.2 Wiring Diagram-Indoor units

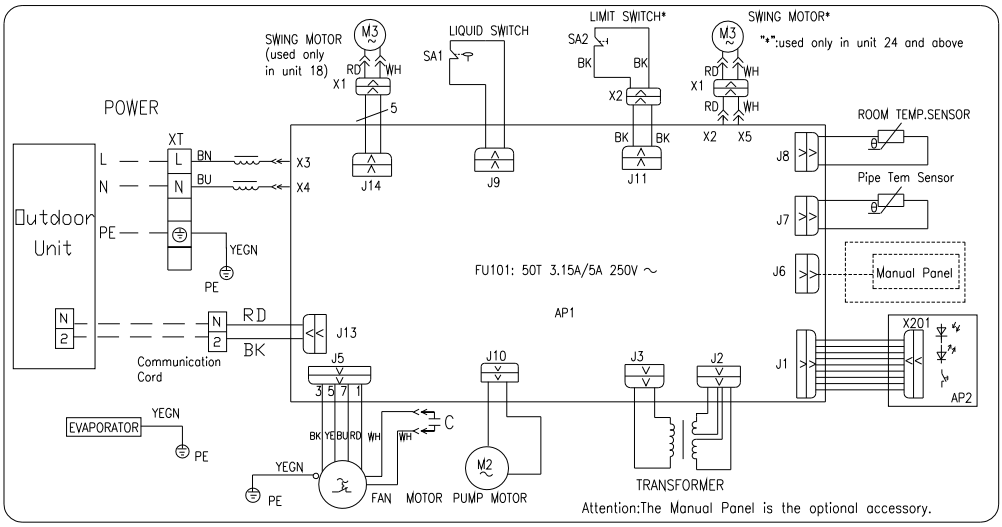
3.2.1 Duct Type

Model: IDI-09；IDI-12；IDI-18；IDI-24 ； IDI-36 ； IDI-45；IDI-50；IDI-60；



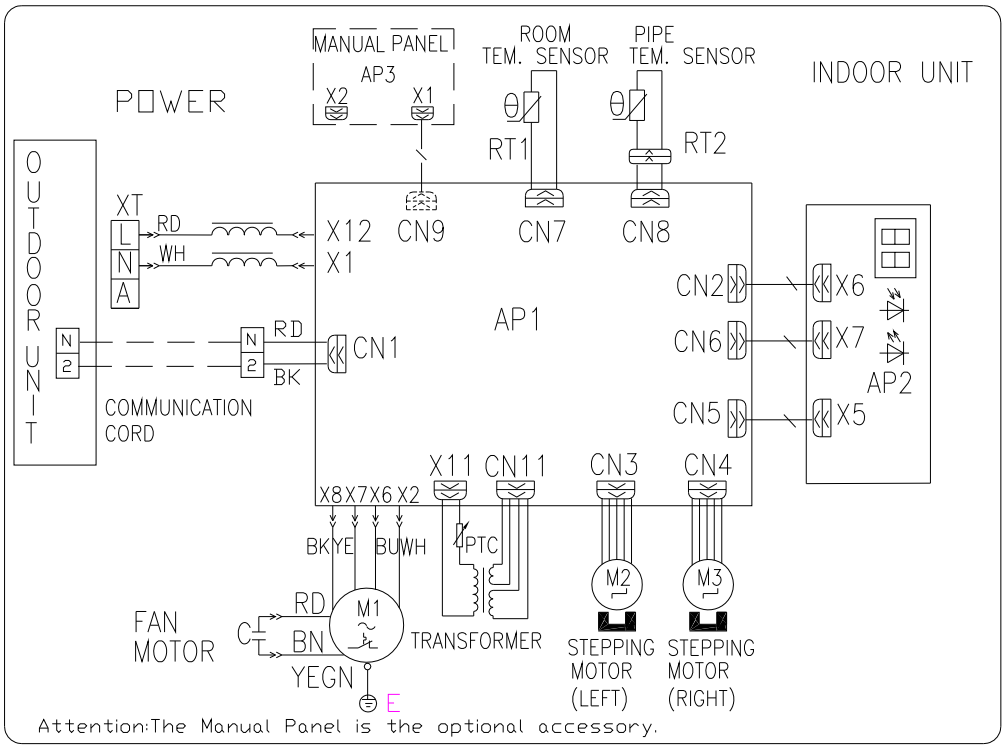
3.2.2 Ceiling Type

Model: ICI-12；ICI-18；ICI-24；ICI-36；ICI-45；ICI-50



3.2.3 Cassettle Type

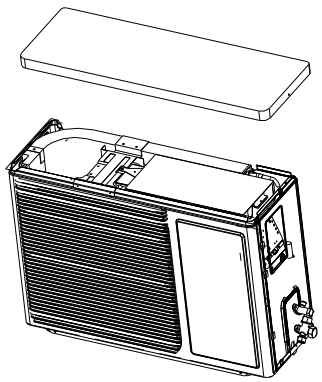
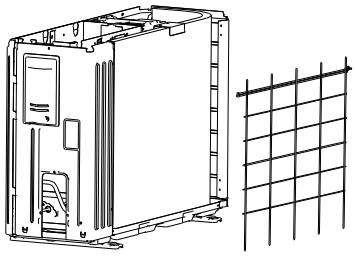
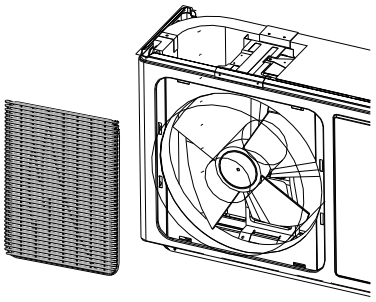
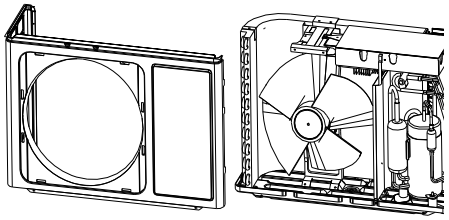
Model: **IKI-09； IKI-12 IKI-18； IKI-24；IKI-36；IKI-45；IKI-50；**

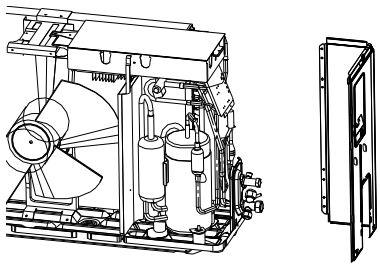
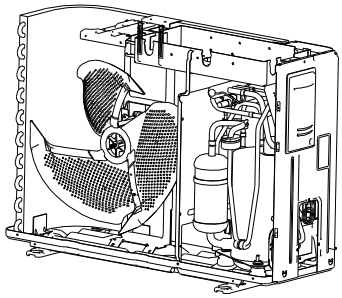
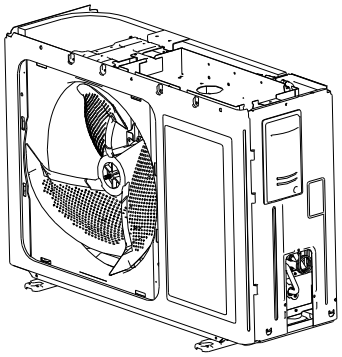
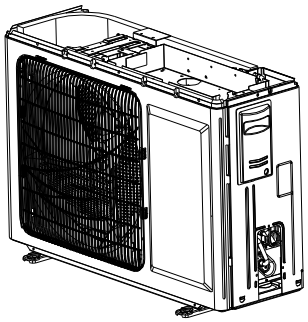
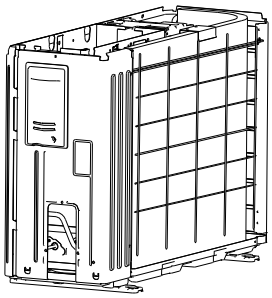

MANUAL PANEL
AP3
X2
X1
ROOM TEM. SENSOR
PIPE TEM. SENSOR
INDOOR UNIT
POWER
RT1
RT2
OUTDOOR UNIT
XT
L
N
A
RD
WH
X12
X1
CN9
CN7
CN8
AP1
CN2
CN6
CN5
X6
X7
X5
AP2
N
2
RD
BK
CN1
COMMUNICATION CORD
X11
CN11
CN3
CN4
X8 X7 X6 X2
BK YE BU WH
PTC
M2
M3
FAN MOTOR
RD
BN
YEGN
M1
TRANSFORMER
STEPPING MOTOR (LEFT)
STEPPING MOTOR (RIGHT)
E
Attention:The Manual Panel is the optional accessory.

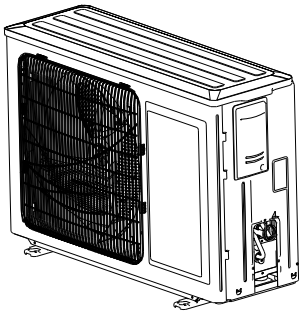
4 DISASSEMBLY AND ASSEMBLY PROCEDURE OF MAIN PARTS_

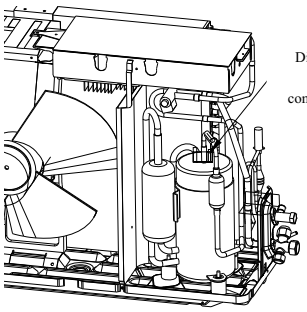
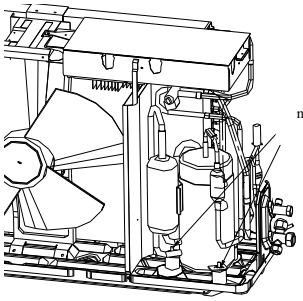
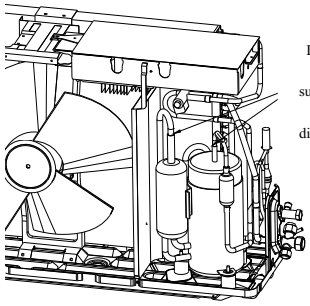
4.1 Outdoor Unit

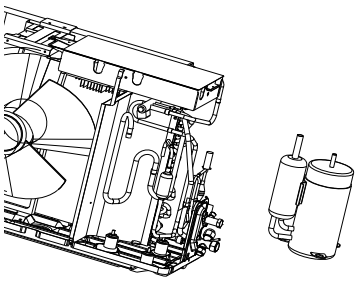
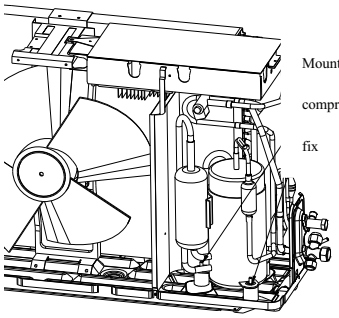
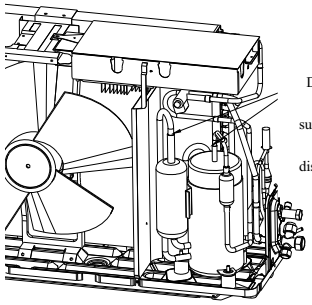
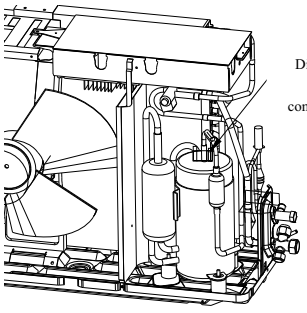
ULS-09~ ULS-36

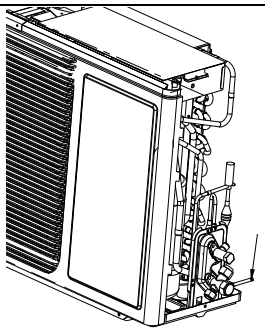
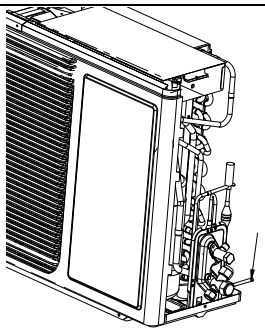
Disassembly and Assembly of external casing		
Remark: Make sure that power supply is cut off before disassembling the external casing.		
Step	Illustration	Handling Instruction
1. Disassembly of coping		●Disassemble the fixing screw surrounding the coping with screwdriver ●Remove coping from the unit.
2. Disassembly of screen		●Loose fixing screw surronding the screen with screwdriver. ●Remove screen from the unit.
3. Disassembly of panel grating		●Disassemble the screws of the fixing panel grating with screwdriver. ●Disassemble and remove the panel grating from the panel (external casing).
4. Disassembly of panel (external casing)		●Disassemble the fixing screw surrounding the panel (external casing); ●Remove the panel (external casing) from the unit.. ●Some types (24k and above) require disassembling the front panel outside the external casing first before

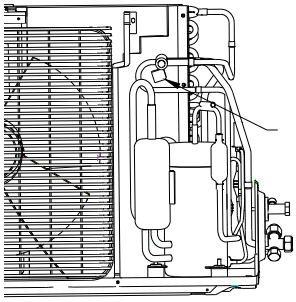
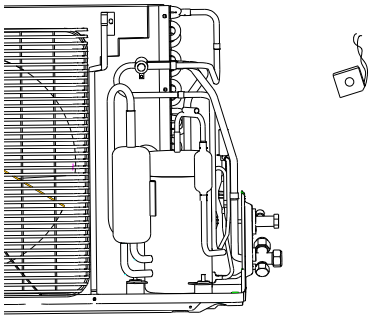
		removing it.
5. Disassembly of right (back) panel		●Disassemble the screws surrounding the right (back) panel with screwdriver. ●Remove the right (back) panel from the unit.
6. Assembly of new right (back) panel		●Put new right (back) panel into right position. ●Screw down the surrounding fixing screw with screwdriver.
7. Assembly of new panel (external casing)		●Put new panel (external casing) into right position on the unit; ●Screw down the surrounding fixing screw with screwdriver. ●Some types (24k and above) need to be equipped with front panel outside the external casing.
8. Assembly of new panel grating		●Put new panel grating into right position on the unit ●Screw down the surrounding fixing screw with screwdriver.
9. Assembly of new screen		●Put new screen into the right position on the unit. ●Screw down the surrounding fixing screw with screwdriver.

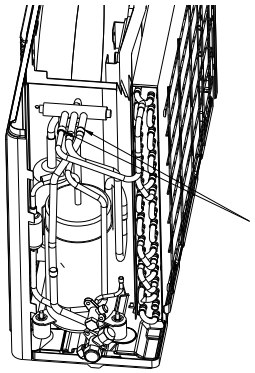
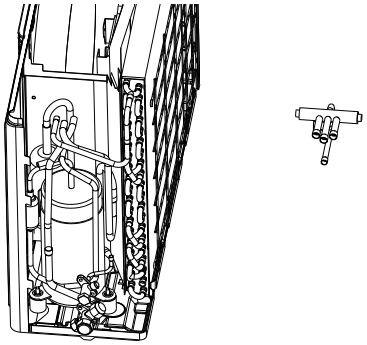
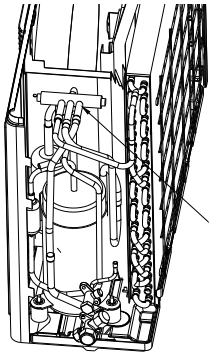
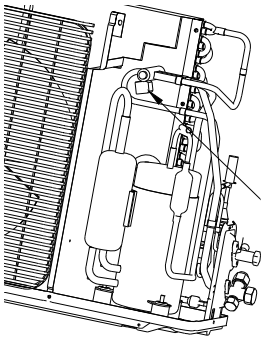
10. Assembly of new coping		●Put the new coping into the right position on the unit. ●Screw down the surrounding fixing screw with screwdriver.

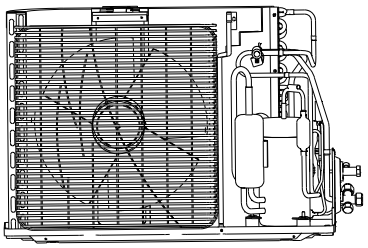
Disassembly and Assembly of Compressor		
Remark : Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the compressor..		
Step	Illustration	Handling Instruction
1. Disassembly of compressor wires	 Disassemble compressor wire	● Loose the fixing screw for the power supply wire with screwdriver. ●Pull down the power supply wire. Attention: During removal of the power supply wire, mark wire color with the corresponding joint number in case of wrong connection.
2. Disassembly of fixing nuts on compressor	 Disassemble fixing nut of compressor	● Disassemble the fixing nut on the compressor with wrench.
3. Disassembly of suction and discharge pipe	 Disassemble suction and discharge pipe	●Heat the suction and discharge pipe with gas welding before removing compressor. ●Provide nitrogen protection during gas welding and the nitrogen pressure should be 0.5±0.1kgf/cm^2 （ relative pressure）. ●Please pay attention to heating in case that surrounding materials should be burnt by high temperature.

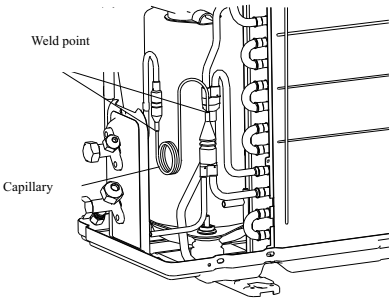
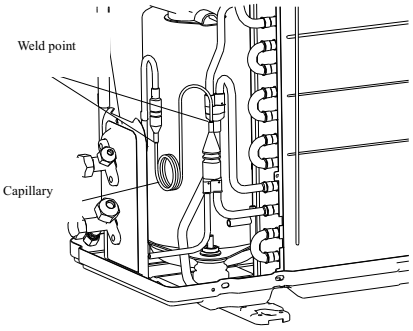
4. Removal of compressor		●Remove compressor from underpan.
5. Assembly of new compressor on the underpan	 Mount new compressor and fix	●Position accurately the new compressor on the unit. ●Screw down fixing nut for compressor with wrench. ●Do not up-side-down compressor during assembly.
6. Connection of suction and discharge pipe of compressor with pipe line system	 Disassemble suction and discharge pipe	●Heat suction and discharge pipe with gas welding before removing compressor. ●rovide nitrogen protection during gas welding and the nitrogen pressure should be 0.5±0.1kgf/cm^2 （ relative pressure）. ●Please pay attention to heating in case that surrounding materials should be burnt by high temperature.
7. Correct connection of wires for power supply of compressor	 Disassemble compressor wire	●Install power supply wire onto fixing in the order of disassembly. ●Screw down fixing screw for power supply wire with screwdriver.。

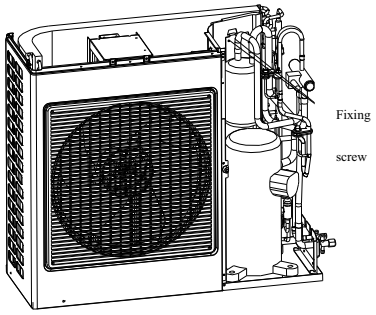
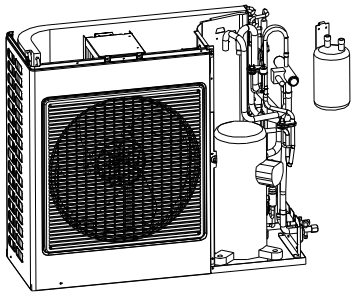
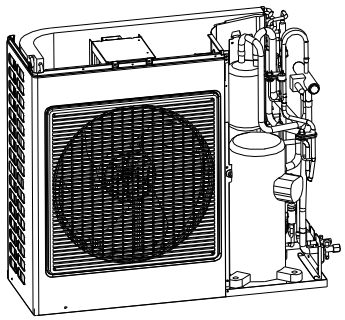
8. Vacuum pumping with fluorin injection mouth		●Pump vacuum through fluorin injection mouth.
9. Refill of cooling medium through fluorin injection mouth		●Refill cooling medium into system through fluorin injection mouth ●Volume of refilling should be in accordance with the requirement on the unit nameplate.

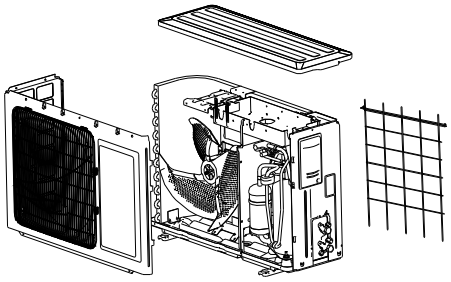
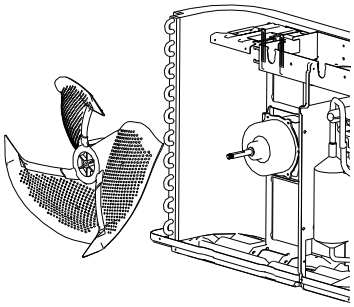
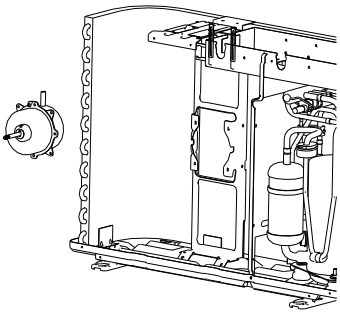
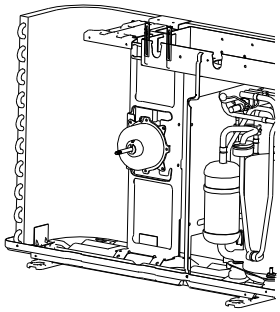
Disassembly and Assembly of 4-way valve		
Remark: Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the 4-way valve.		
Step	Illustration	Handling Instruction
1. Disassembly of solenoid valve		●Cut off power supply and reclaim cooling medium properly. ●Disassemble solenoid valve with wrench.
2. Removal of electromagnetic valve		●Take and remove solenoid valve from 4-way valve.

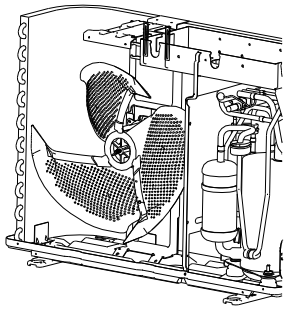
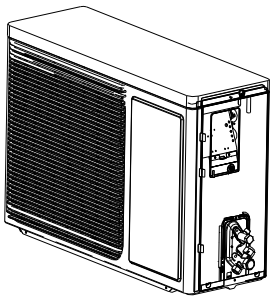
3. Disassembly of 4-way valve	 Disassemble connecting pipes at E,S,D and C orifices	●Heat connection pipes for 4 pipes of 4-way valve with gas welding before removal of 4-way valve. ●Record the direciton of the 4-way valve and installation postition of each pipe before welding away 4-way valve.
4. Removal of 4-way valve		●Remove the old 4-way valve from the pipe line.
5. Assembly of new 4-way valve	 Mount a new 4-way vlave	●Position accurately the new 4-way valve. ●Connect new 4-way valve with pipe line. ●Wrap the valve with wet cloth when welding 4-way valve in case sliding block inside the valve should be burnt and water flow into the pipe line. ●Welding with nitrogen and the nitrogen pressure shall be 0.5±0.1kgf/c ㎡(relative pressure).
6. Assembly of solenoid valve	 Mount solenoid valve	●Assemble solenoid valve onto the new 4-way valve in order of disassembly.
7. Examination of System and cooling medium		●Pump vacuum and fill cooling medium if the

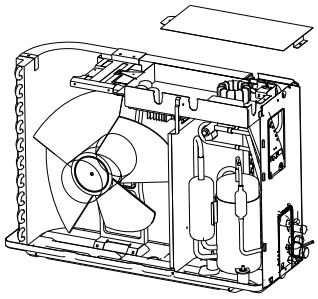
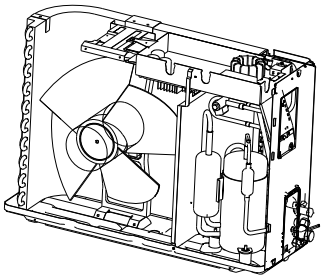
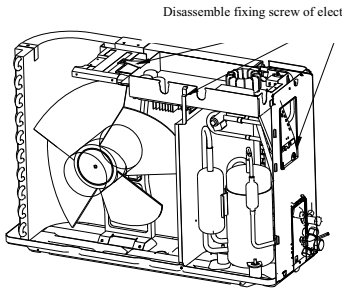
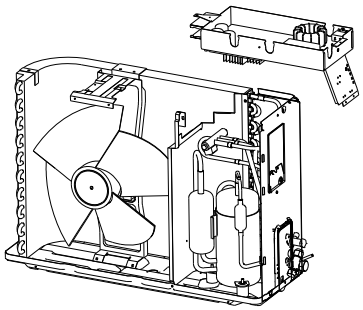
filling		system leak test passes.

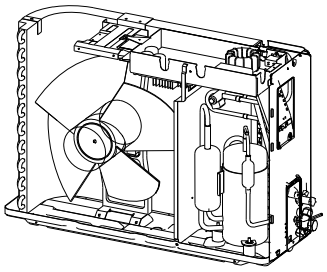
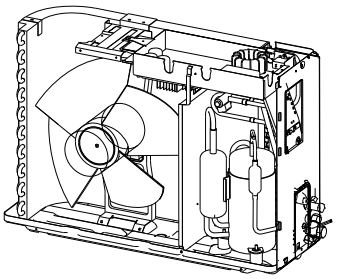
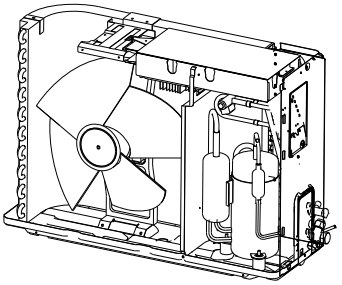
Disassembly and Assembly of capillary		
Remark: Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the capillary.		
Step	Illustration	Handling Instruction
1. Disassembly of capillary		●Weld two welding points connecting capillary with other pipe lines. ●Remove capillary.
2. Assembly of new capillary		●Assemble new capillary. ●Weld the points connected with other pipe lines. ●Re-examine the leak hunting of system. Pump vacuum and fill the cooling medium.

Disassembly and Assembly of Vapour Liquid Separator		
Remark: Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the vapor liquid separator. （Needless for types under 24kBtu/h）		
Step	Illustration	Handling Instruction
1. Disassembly of Fixing screw for liquid reservoir		●Disassemble two fixing screws for reservoir pothook with screwdriver.
2. Disassembly of Vapor liquid separator		●Weld open two pipes connecting vapor liquid separator with pipe line with gas welding. ●Remove vapor liquid separator.
3. Assembly of New vapor liquid separator		●Position accurately new vapor liquid separator. ●Connect new vapor liquid separator with pipe line using gas welding. ●Screw down two fixing screws again at the pothook.

Disassembly and Assembly of Axial Flow Fan and motor		
Remark: Make sure power supply of the unit is cut down before removal of axial flow fan and motor.		
Step	Illustration	Handling Instruction
1. Disassembly of outer parts		Handling Instruction
2. Disassembly of axial flow fan		●Disassemble outer parts of unit coping, panel(external casing), screen,etc. according to the discription above in order to disassemble axial flow fan and motor conveniently.
3. Disassembly of fan motor		●Hold the fans without movement. ●Disassemle fixing nuts for the fans with wrench. ●Take down and remove fans from motor.
4. Assembly of new motor		●Open the cover of electical parts box. ●Loose the connecting plug for motor wires and pull out the wires through the hole. ●Disassemble the fixing screw on the motor support and remove the motor.

5. Assembly of new axial flow fan		●Position accurately new motor on the motor support. ●Screw down the fixing screw to fasten the motor. ●Connect the motor wire through the hole with the corresponding position inside the electrical parts box and fasten the connecting plug. ●Close the cover and screw down the screw.
6. Assembly of outer parts		●Position reliably the new fan on the motor axis. ●Hold the fans without movement. ●Screw down fixing screws for fan with wrench.

Disassembly and Assembly of electrical parts box		
Remark: Make sure power supply of the unit is cut down before removal of electrical parts box or electrical parts box modules.		
Step	Illustration	Handling Instruction
1. Disassembly of cover of electrical parts box		●Cut off the power supply. ●Disassemble fixing screw between electrical parts box cover and the box with screwdriver ●Take away and remove the cover from electrical parts box.
2. Pull away the power supply wires for components like motor, etc.		●Disassemble electrical components, like mainboard inside the electrical parts box connected with outer componets (power-loaded wires for componets like compressor, motor). Attention: Record right position for wire connection during disassembly of connecting wires.
3. Disaasembly of electrical parts box modules		●Disassemble fixing screws between electrical parts box and middle clapbord, motor support as well as right panel with screwdriver.
4. Removal of electrical parts box modules		●Hold the bottom of electrical parts box and lift it upward to get rid of the clip on the middle clapboard. ●Remove electrical parts box modules.

5. Assembly of new electrical parts box modules		●Position accurately the new electrical parts box. ●Re-fasten the electrical parts box modules and screw down with screwdriver.
6. Connection of power supply wires of each component		●Re-connect the connection wires of each components with right position according to the order of disassembly.
7. Assembly of electrical parts box		●Assembly accurately the electrical parts box. ●Re-fasten and screw down the surrounding fixing screw with screwdriver.

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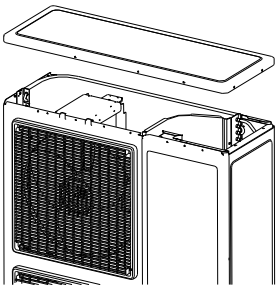
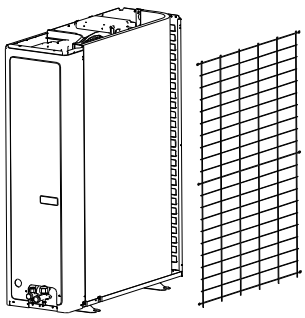
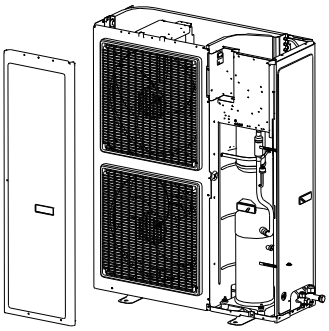
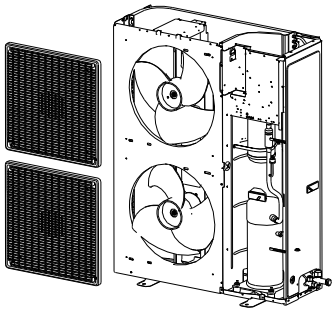
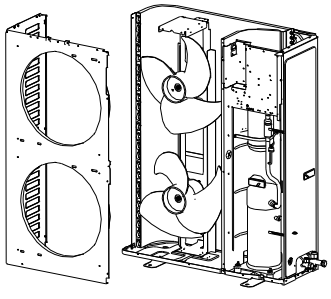
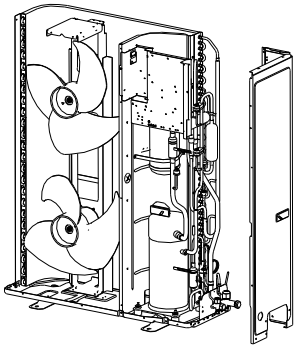
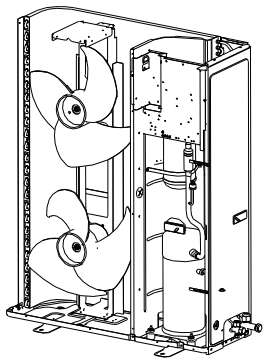
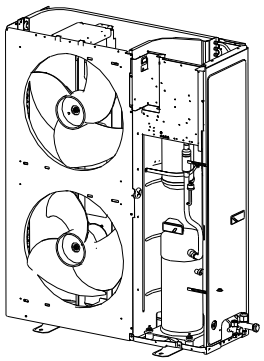
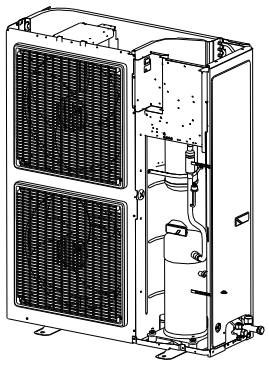
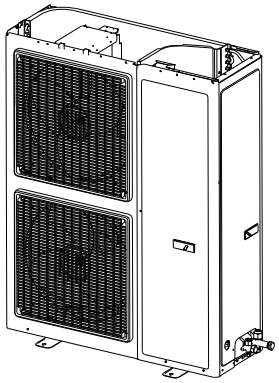
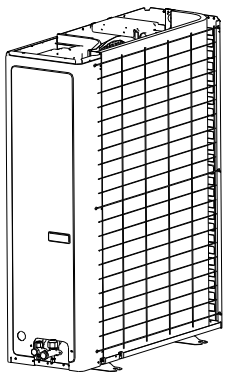
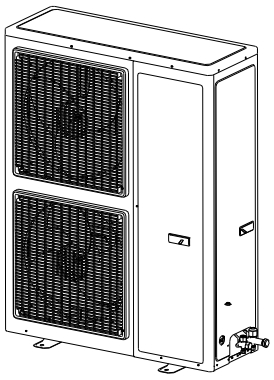
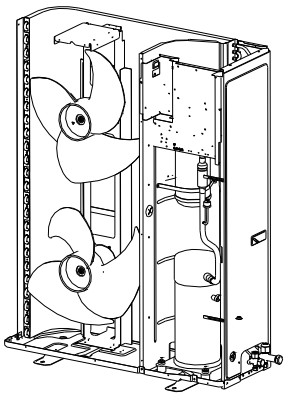
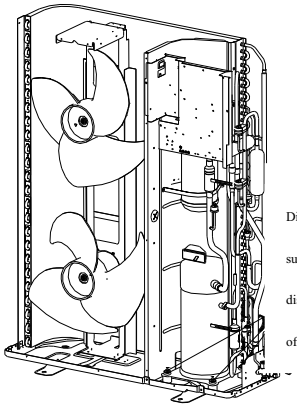
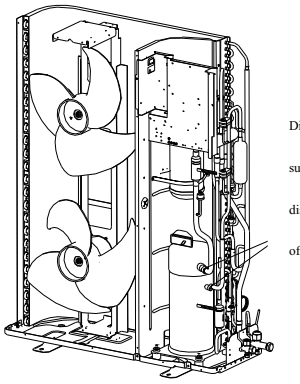
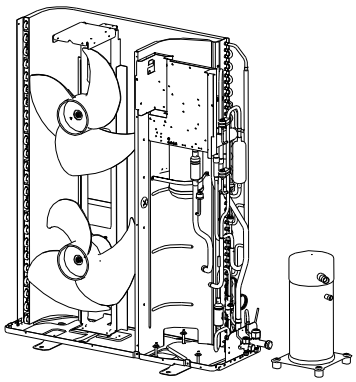
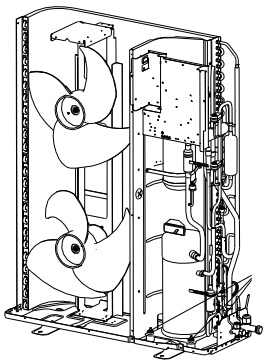
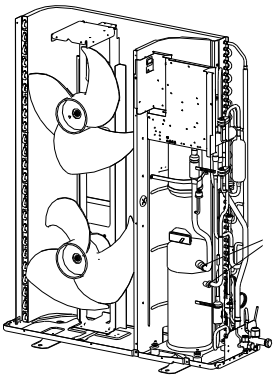
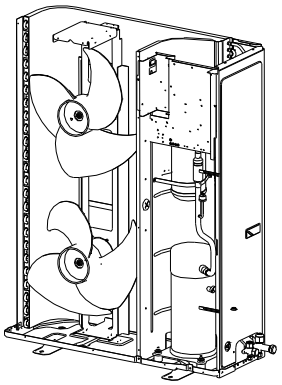
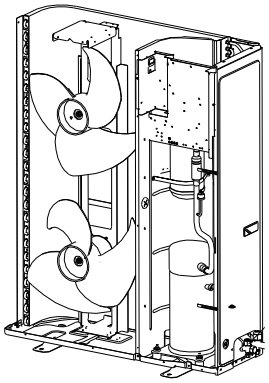
Disassembly and Assembly of external casing		
Remark: Make sure power supply of the unit is cut down before removal of external casing.		
Step	Illustration	Handling Instruction
1. Disassembly of coping		●Disassemble fixing screws surrounding the coping with screwdriver. ●Remove coping from the unit.
2. Disassembly of screen		●Loose the fixing screws surrounding the screen with screwdriver. ●Remove screen from the unit.
2. Disassembly of front panel		●Loose the fixing screws surrounding the front panel with screwdriver. ●Remove the front panel from the unit.
3. Disassembly of panel grating		●Loose the fixing screws for the panel grating with screwdriver. ●Take away and remove panel grating fromthe external casing.

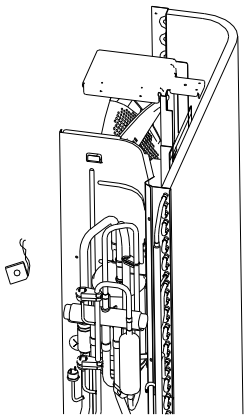
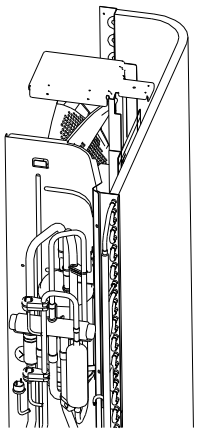
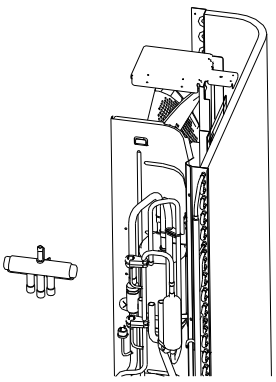
4. Disassembly of external casing		●Loose the fixing screws surrounding external casing with screwdriver. ●Remove the external casing from the unit.
5. Disassembly of back panel		●Loose the fixing screws surrounding the back panel with screwdriver. ●Remove the back panel from the unit.
6. Assembly of new back panel		●Position accurately the new back panel. ●Screw down the surrouding fixing screws with screwdriver.
7. Assembly of new external casing		●Position accurately the new panel on the unit. ●Screw down the surrouding fixing screws with screwdriver.

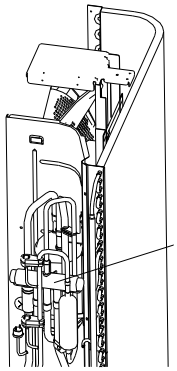
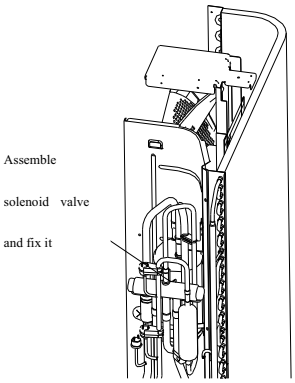
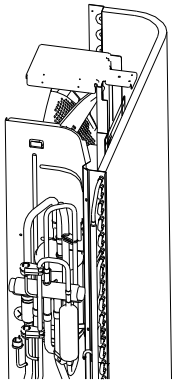
8. Assembly of new panel grating		●Position accurately the new panel grating on the unit panel. ●Screw down the surrouding fixing screws with screwdriver.
9. Assembly of new front panel		●Position accurately the new front panel. ●Screw down the surrouding fixing screws with screwdriver.
10. Assembly of new screen		●Position accurately the new screen. ●Screw down the surrouding fixing screws with screwdriver.
11. Assembly of new coping		●Position accurately the new coping. ●Screw down the surrouding fixing screws with screwdriver.

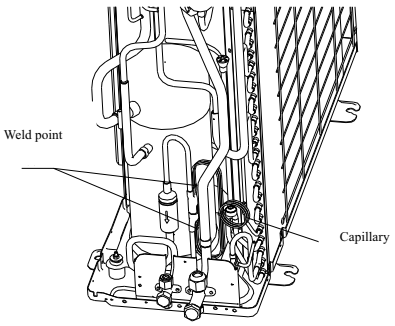
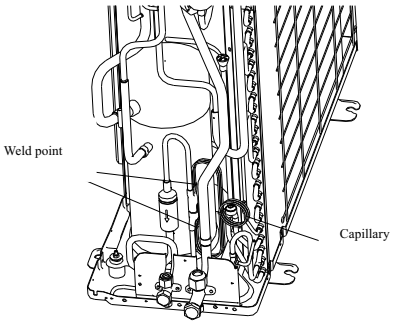
Disassembly and Assembly of Compressor		
Remark : Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the compressor..		
Step	Illustration	Handling Instruction
1. Disassembly of power supply wire		●Loose the fixing screws for power supply wire. ●Pull away the power supply wire. Attention: During removal of the power supply wire, mark wire color with the corresponding joint number in case of wrong connection.
2. Disassembly of fixing nuts on compressor		●Disassemble fixing nuts on compressor with wrench.
3. Disassembly of suction and discharge pipe		●Heat the suction and discharge pipe with gas welding before removing compressor. ●Provide nitrogen protection during gas welding and the nitrogen pressure should be 0.5±0.1kgf/cm^2 （ relative pressure）. ●Please pay attention to heating in case that surrounding materials should be burnt by high temperature.

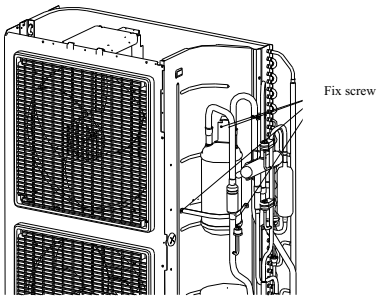
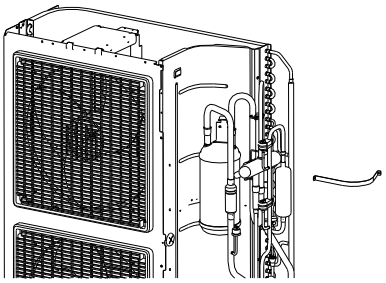
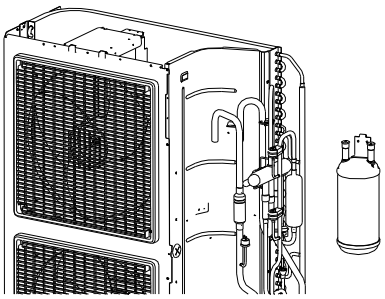
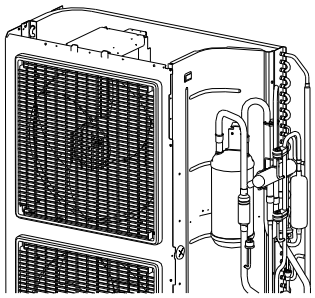
4. Removal of compressor		●Remove compressor from underpan.
5. Assembly of new compressor onto underpan	 Fix the fixing nut of compressor	●Position accurately the new compressor. ●Screw down fixing nuts for compressor with wrench. ●Do not up-side-down compressor during assembly.
6. Connection of suction and discharge pipe with pipeline system	 Weld suction and discharge pipe of compressor	●Connect compressor with other pipeline using gas welding. ●Provide nitrogen protection during gas welding and the nitrogen pressure should be 0.5±0.1kgf/cm^2 （ relative pressure）. ●Please pay attention to heating in case that surrounding materials should be burnt by high temperature.

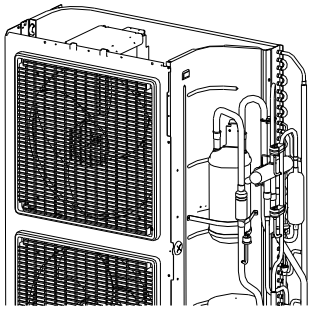
7. Connection power supply wires of compressor		●Assemble the power supply wires onto right position according to the order of disassembly. ●Screw down the fixing screw for the power supply wires with screwdriver.
8. Vacuum pumping and cooling medium filling through valve	 Vacuum piping and refrigerant charge via valve	●Pump the system vacuum through valve before refill cooling medium. ●Volume of refilling should be in accordance with the requirement on the unit nameplate.

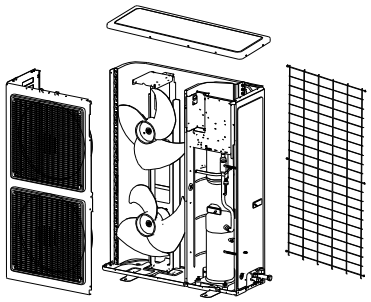
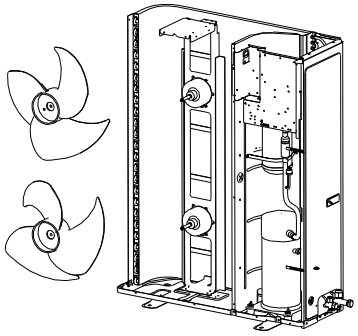
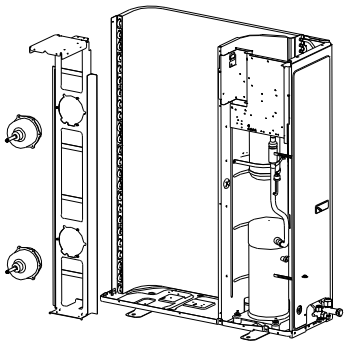
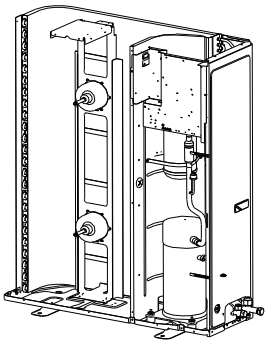
Disassembly and Assembly of 4-way valve		
Remark: Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of 4-way valve.		
Step	Illustration	Handling Instruction
1. Disassembly of solenoid valve		●Cut off power supply and reclaim cooling medium properly. ●Disassemble the assembling screw for solenoid valve. ●Disassemble solenoid valve with wrench.
3. Disassembly of 4-way valve		●Heat connection pipes for 4 pipes of 4-way valve with gas welding before removal of 4-way valve. ●Record the direciton of the 4-way valve and installation postition of each pipe before welding away 4-way valve.
4. Removal of 4-way valve		●Remove the old 4-way valve from the pipe line.

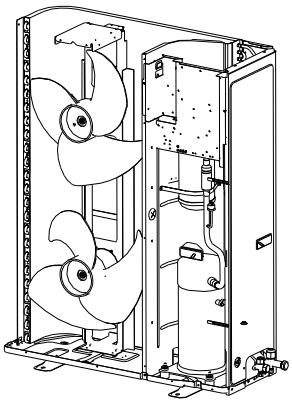
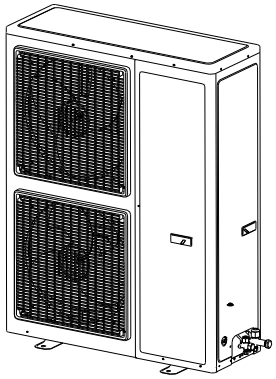
5. Assembly of New 4-way valve		●Position accurately the new 4-way valve. ●Connect new 4-way valve with pipe line. ●Wrap the valve with wet cloth when welding 4-way valve in case sliding block inside the valve should be burnt and water flow into the pipe line. ●Welding with nitrogen and the nitrogen pressure shall be 0.5±0.1kgf/c ㎡(relative pressure).
6. Assembly of solenoid valve		●Assemble solenoid valve onto the new 4-way valve in order of disassembly.
7. Examination of System and cooling medium filling		●Pump vacuum and fill cooling medium if the system leak test passes.

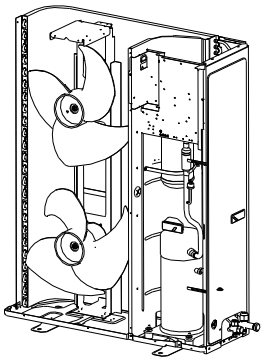
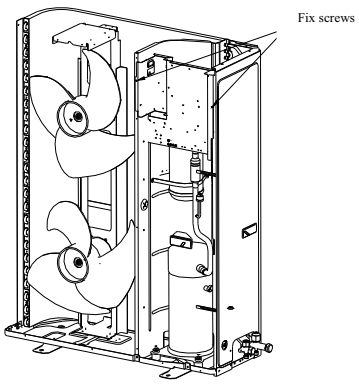
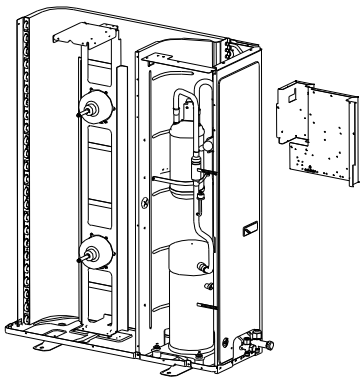
<table>
<tr><td colspan="3">Disassembly and Assembly of capillary</td></tr>
<tr><td colspan="3">Remark: Make sure there isn’t any refrigerant in pipe system and the power supply is cut off before removal of the capillary.</td></tr>
<tr><td>Step</td><td>Illustration</td><td>Handling Instruction</td></tr>
<tr><td>1. Disassembly of Capillary</td><td>Assemble solenoid valve
 
</td><td>●Weld two welding points connecting capillary with other pipe lines.
●Remove capillary.</td></tr>
<tr><td>2. Assembly of New capillary</td><td> 
</td><td>●Assemble new capillary.
●Weld the points connected with other pipe lines.
●Re-conduct the system leak test. Pump vacuum and fill the cooling medium.</td></tr>
</table>

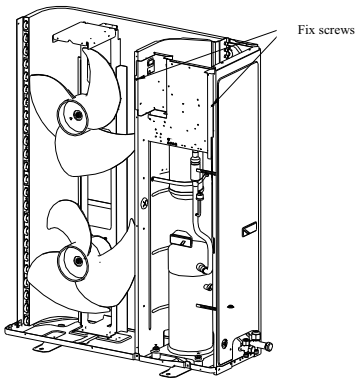
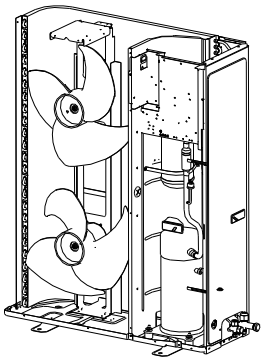
Disassembly and Assembly of Vapour Liquid Separator		
Remark: Make sure there isn't any refrigerant in pipe system and the power supply is cut off before removal of the vapor liquid separator.		
Step	Illustration	Handling Instruction
1. Disassembly of retaining clips for liquid reservoir		●Disassemble the fixing screws on the pothooks and retaining clips of the reservoir with screwdriver.
2. Removal of retaining clips for liquid reservoir		●Remove the retaining clips for liquid reservoir.
3. Disassembly of vapor liquid separator		●Weld open two pipes connecting vapor liquid separator with pipe line with gas welding. ●Remove vapor liquid separator.
4. Assembly of new vapor liquid separator		●Position accurately new vapor liquid separator. ●Connect new vapor liquid separator with pipe line using gas welding.

5. Assembly of retaining clips for liquid reservoir		●Re-assemble the retaining clips for liquid reservoir and screw down the fixing screw

Disassembly and Assembly of Axial Flow Fan and motor		
Remark: Make sure power supply of the unit is cut down before removal of axial flow fan and motor.		
Step	Illustration	Handling Instruction
1. Disassembly of outer parts		●Disassemble outer parts of unit coping, panel(external casing), screen,etc. according to the discription above in order to disassemble axial flow fan and motor conveniently.
2. Disassembly of axial flow fan		●Hold the fans without movement. ●Disassemle fixing nuts for the fans with wrench. ●Take down and remove fans from motor.
3. Disassembly of fan motor		●Loose the connecting plug for motor wires and pull out the wires through the hole. ●Disassemble fixing screws for motor support and remove the motor support. ●Disassemble the fixing screws for motor on the motor support and remove the motor.
4. Assembly of new motor		●Position accurately the new motor on the motor support. ●Screw down the fixing screw for motor. ●Assemble the whole motor support onto the underpan using fixing screws. ●Connect the motor wire through the hole with the corresponding position

		inside the electrical parts box and fasten the connecting plug.
5. Assembly of new axial flow fan		●Position reliably the new fan on the motor axis. ●Hold the fans without movement. ●Screw down fixing screws for fan with wrench.
6. Assembly of outer parts		●Re-assemble the outer parts of unit coping, panel (external casing) and screen, etc. according to the discription before.

Disassembly and Assembly of electrical parts box		
Remark: Make sure power supply of the unit is cut down before removal of electrical parts box or electrical parts box modules.		
Step	Illustration	Handling Instruction
1. Pull away the power supply wires for components like motor, etc.		●Disassemble electrical components, like mainboard inside the electrical parts box connected with outer componets (power-loaded wires for componets like compressor, motor). Attention: Record right position for wire connection during disassembly of connecting wires.
2. Disaasembly of electrical parts box modules		●Disassemble fixing screws between electrical parts box and middle clapbord, motor support as well as right panel with screwdriver.
3. Removal of electrical parts box modules		●Remove electrical parts box modules.

4. Assembly of new electrical parts box modules		●Position accurately the new electrical parts box. ●Re-fasten the electrical parts box modules and screw down with screwdriver.
5. Connection of power supply wires of each component		●Re-connect the connection wires of each components with right position according to the order of disassembly.

4.2 Indoor Unit

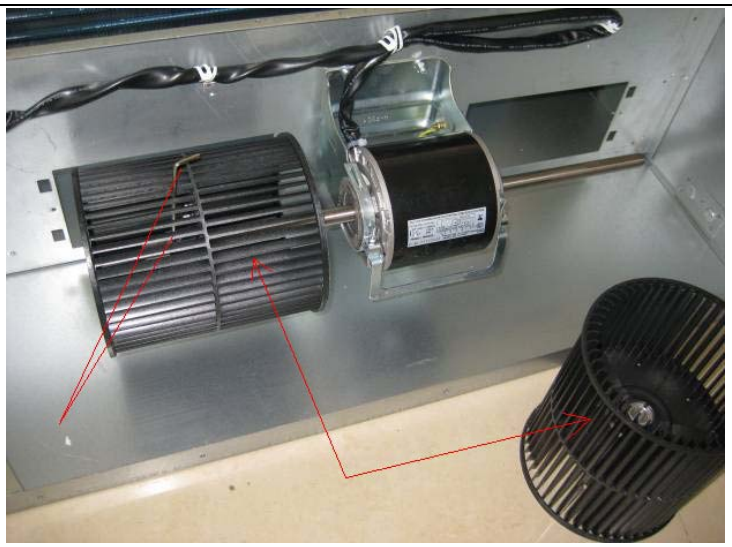
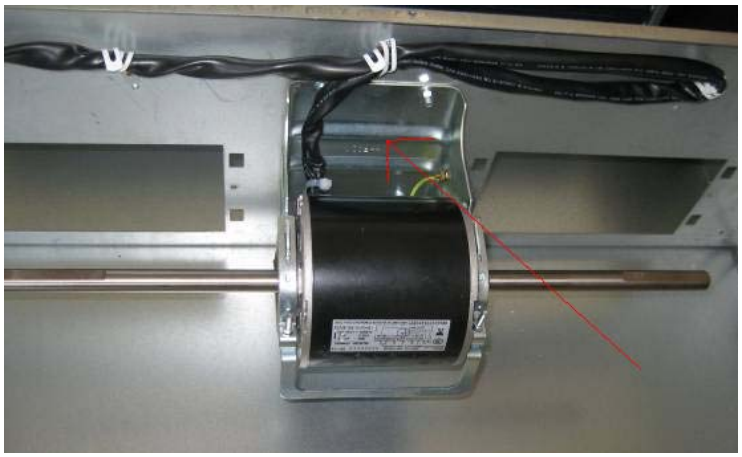
4.2.1 Duct Type

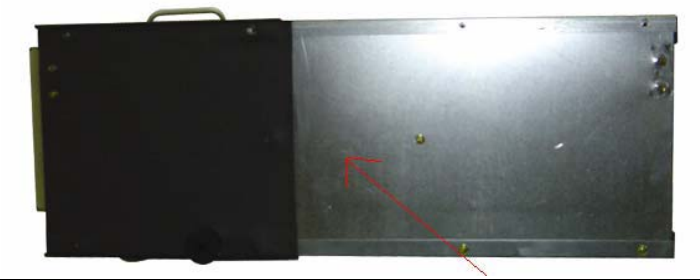
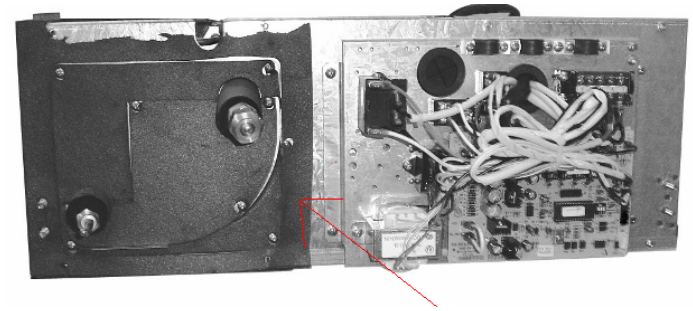
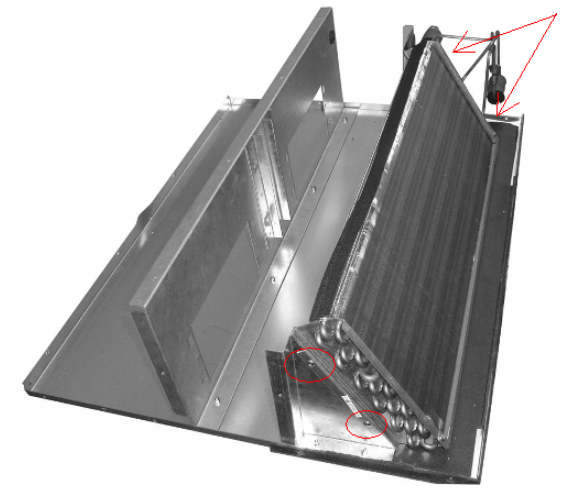
IDI-09, IDI-12, IDI-18 Disassembly procedure

Disassembly of External Casing of Group		
Remark: Make sure the power supply is cut off before removal and protect all the parts during disassembly, especially the screws that should be collected together, in case of missing them.		
Step	Illustration	Handling Instruction
1. Disassembly of filter screen for back return air		●Pull two filter screens for back return air（As shown in the graph, the arrow represents filter screens for back return air）
2. Disassembly of side panel for back return air		·●Disassemble the fastening screws for back return air and take away the back return air side panel（as shown in the graph）。
3. Disassembly of cover plate for return air		●Disassemble the fastening screws for return air cover plates and take away the return air cover plate（As shown in the graph, the arrow represents cover plates for return air）
4. Disassembly of cover plate		●Disassemble the fastening screws for cover plate and take away the cover plate（As shown in the graph, the arrow represents cover plates）

Disassembly of water-containing plate		
Remark：Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Removal of water-containing plate		●Disassemble the fastening screws for water-containing plate and take away the water-containing plate（As shown in the graph, the arrow represents water-containing plate）

Disassembly of fans and motors		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the fastening screws for fans.		
Step	Illustration	Handling Instruction
1. Disassembly of front and back scroll cases		●Disassemble the fastening screws for scroll cases and take away the front and back scroll cases（As shown in the graph, the arrow represents front and back scroll cases）

2. Disassembly of centrifugal fan		●Disassemble the fastening screws for fans with inner hexagonal. Remove the centrifugal fan. (As is shown in Grapgh 7, the line without an arrow represents inner hexagonal and the position of fastening screws under its influence, and arrow represents centrifugal fan.)
3. Disassembly of motor support module		●Disassemble the fastening screws for motor support and take away the motor support modules（As shown in the graph, the arrow represents motor support）
4. Disassembly of motor		●Disassemble the connecting wires for motor inside the electrical parts box and remove the motor.

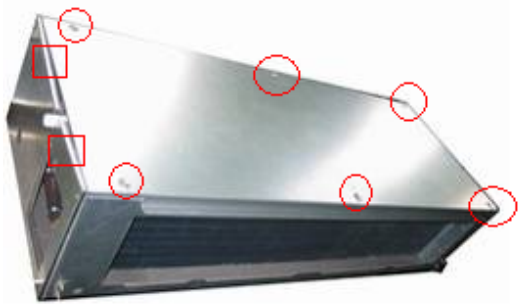
Disassembly of evaporator		
Remark: Make sure the power supply is cut off and protect the copper tube and aluminum fin. If the time for disassembly shall be long, put the copper tube under pressurized condition.		
Step	Illustration	Handling Instruction
1. Disassembly of right panel		●Disassemle the fastening screws on the right panel and remove right panel(as is shown in the graph, arrow represents right panel).
2. Disassembly of left panel		●Disassemle the fastening screws on the left panel and remove left panel(as is shown in the graph, arrow represents left panel).
3. Disassembly of evaporator		●Disassemle the fastening screws on the evaporator. (As is shown in the graph, in the circle there are two fastening screws and in the direction of arrow, two more.) ●Remove the evaporator.
4. Disassembly of evaporator support		●Disassemble the self-tapping screw on the evaporator support and remove the evaporator support.(As is shown in the graph, in the circle there are two fastening screws and in the similar position in the direction of arrow, two more.)

IDI-24, IDI-36, IDI-45, IDI-50, IDI-60I Disassembly procedure

Disassembly of filter screen for return air		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly. Do not put filter screen near the high temperature heat source.		
Step	Illustration	Handling Instruction
Disassembly of filter screen for return air		●Compress the filter screen for return air down on the guide slot sponge, and remove according to the direction shown by the arrow. There are 2 filter screen for return air.

Disassembly of electrical parts box cover panel and electrical parts box		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the electrical components. Do not dampen or hit them.		
Step	Illustration	Handling Instruction
1. Disassembly of electrical parts box cover panel		●Disassemble the screw according to the position shown in the circle and the box and remove the electrical parts box in the direction of the arrow.
2. Disassembly of electrical parts box		●Disassemble the fastening screw and remove the electrical parts box. (As is shown in the graph, there are 2 fastening screws in the circle and the screws in the direction of arrow shall be disassembled too.)

Disassembly of drainage pump		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Disassembly of fastening screws on seal-plates of inner panels and the drainage pipe		●Disassemble the fastening screws on seal-plates of inner panels and the pump drainage pipe. Remove the seal-plates.(As is shown in the graph, the circle represents fastening screws on seal-plates and box the fastening screws on drainage pipe. All the 8 screws shall be disassembled.)
2. Disassembly of fastening screws on the drainage pump		●Disassemble the fastening screws on the dreainage pump. (As is shown in the graph, the circle represents the position of screws.)
3. Removal of condensed water drainage pump		●Removed condensed water drainage pump is shown in the graph.

Disassembly of water-containing plate		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Disassembly of cover plate		●Disassemble the fastening screws on the cover plate and remove the cover plate. (As is shown in the graph, circle represents 6 fastening screws under the cover plate and the box represents two fastening screws on water-containing plate symmetrically arranged both on left and right.)
2. Disassembly of water-containing plate		●Disassemble the fastening screws on the water-containing plate, pull upward and remove the water-containing plate. Disassembled water-containing plate is shown in the graph.

Disassembly of fan and motor		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Disassembly of fan		●Disassemble the fixing screws on the fan components. (As is shown in Graph 10, circle represents 6 screws.)
2. Disassembly of motor		●Disassemble the fastening screws on the fan and motor. Remove the fan. (As is shown in Graph 11, box represents screws.)

Disassembly of evaporator		
Remark: Make sure the power supply is cut off and protect the copper tube and aluminum fin. If the time for disassembly shall be long, put the copper tube under pressurized condition.		
Step	Illustration	Handling Instruction
1. Disassembly of fixing screws on the side panels of evaporator		●Disassemble the fastening screw connecting left and right side panels on the evaporator and the upper cover plate. (As is shown in the arrow's direction in Graph 12.)
2. Disassemble fastening screws connecting evaporator valve seal-plate and joint flange		●Disassemble the fastening screws on the valve seal-plate and remove the valve seal-plate. Disassemble the fastening screws on the evaporator's joint flange. (As is shown in the graph, box represents fastening screws on seal-plates while circle the fastening screws on joing flange.

3. Removal of evaporator		●Remove the evaporator. Removed evaporator is shown in the graph.

Disassembly of External casing cabinet		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Disassembly of fastening screws between cover plates		●Disassemble the fastening screws between right and left panels and upper cover plates. Disassemble right and left panels. (As is shown in the graph, circle represents screws.)
2. Disassembly ofexternal casing cabinet		●Disassembled external casing cabinet is shown in the graph.

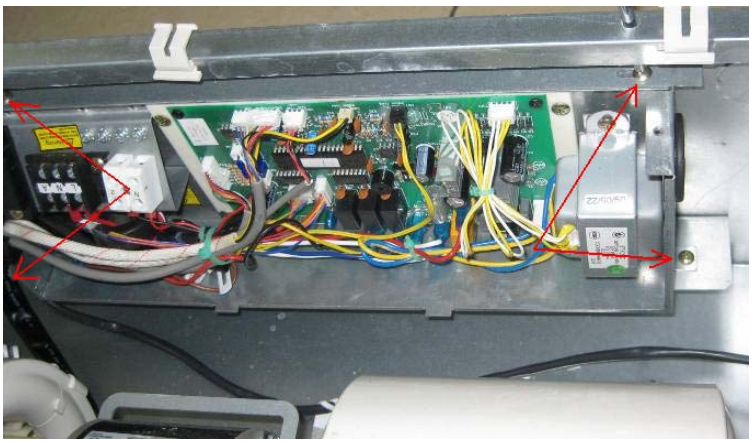
4.2.2 Ceiling Type

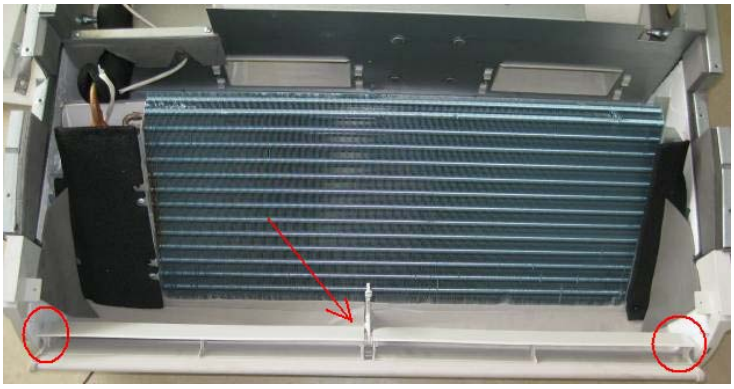
Disassembly of panel grating module		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly. Do not put filter screen near the high temperature heat source.		
Step	Illustration	Handling Instruction
Disassembly of panel grating module		●Move down the clip of the panel grating modules until the panel grating is open. (As is shown in the graph, arrow represents the position of bottons. There are two clips for each grating.)

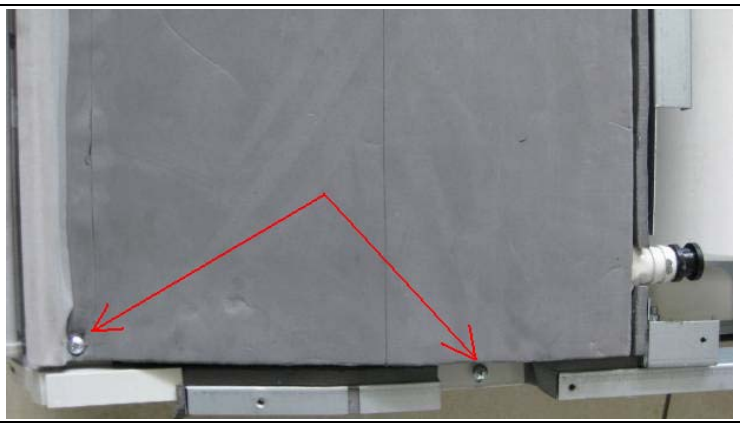
Disassembly of right and left finishing plates		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly. Do not scratch the outer parts.		
Step	Illustration	Handling Instruction
Disassembly of right and left finishing plates		●Disassemble the screws as shown in the graph with screwdriver and then push upward to remove the right and left finishing plates.(As is shown in the graph, arrow represents the position of screws.)

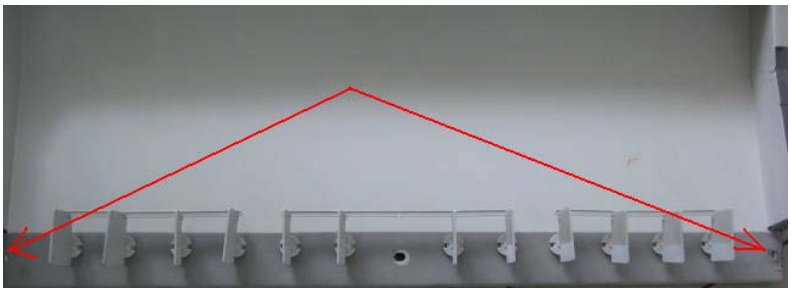
Disassembly of panel parts		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly. Do not scratch the outer parts.		
Step	Illustration	Handling Instruction

Disassembly of panel parts		●Disassemble the 8 screws shown by the arrow in the graph with screwdriver (two on both right and left and 4 in the front) and then remove the panel parts.

Disassembly of electrical parts box components		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the components inside the box in case of water and hit.		
Step	Illustration	Handling Instruction
1. Disassembly of electrical parts box cover panel		●Disassemble 2 screws as shown by the arrow in the graph on left and remove the electrical parts box cover panel.
2. Disassembly of electrical parts box modules.		●Disassemble 4 screws as shown by the arrow in the graph on left (two screws on both sides)and remove the electrical parts box modules and the wires.

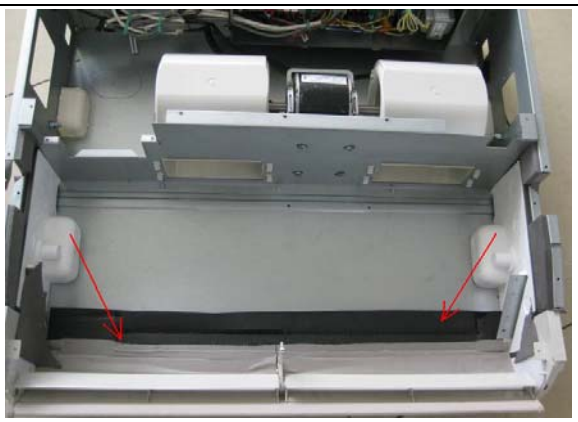
Disassembly of air deflecting plate modules		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the joints of the air deflecting plate.		
Step	Illustration	Handling Instruction
Disassembly of air deflecting plate modules		●Remove the air deflecting plates from the air deflecting plate support assembly, and then remove both ends from the air sweeping motor. joint (As is shown in the graph, arrow represents the support assembly and circle the air sweeping motor joint.)

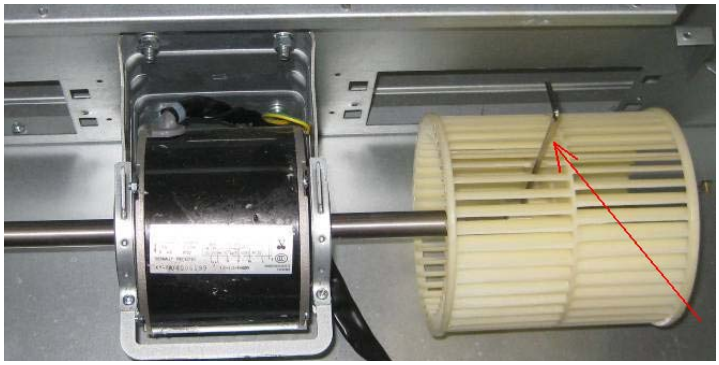
Disassemble of water-containing plate modules		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Disassemble of water-containing plate modules		●Disassemble 4 screws shown in the graph with screwdriver (two screws on both left and right), and remove the water-containing plate modules.

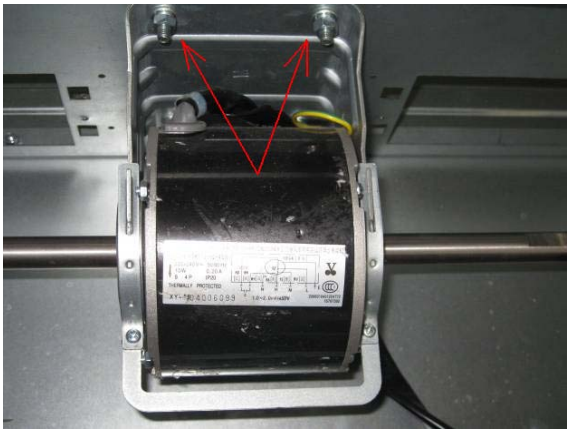
Disassembly of fixing plate modules for air sweeping fans		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the connection part of air sweeping fans.		
Step	Illustration	Handling Instruction
Disassembly of fixing plate modules for air sweeping fans		●Disassemble the screws on both ends of fixing plate modules for air sweeping fans (1 for both sides) and remove the fixing plate modules for air sweeping fans from the air deflecting support.

Disassembly of evaporator components		
Remark: Make sure the power supply is cut off and protect the copper tube and aluminum fin. If the time for disassembly shall be long, put the copper tube under pressurized condition.		
Step	Illustration	Handling Instruction
Disassembly of evaporator components		●Disassemble the screws as shown by the arrow in the graph with screwdriver. (There are 4 screws on left and right of the evaporator and 2 on evaporator outlet press plate modules)

Disassembly of fixing plate modules for air sweeping fans		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Disassembly of fixing plate modules for air sweeping fans		●Disassemble the screws shown in the graph with screwdriver.

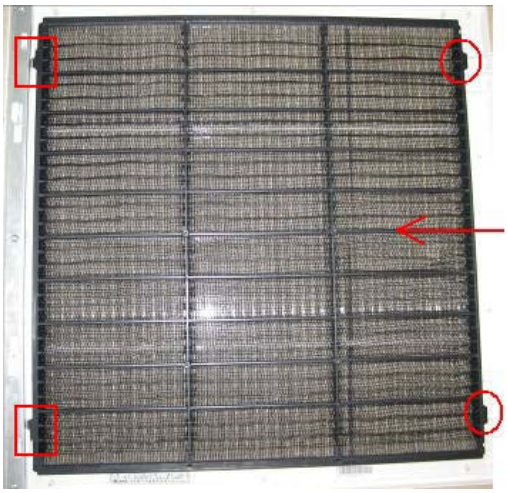
Disassembly of right and left polystyrene foam plates modules		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly. Do not heat or hit polystyrene foam modules.		
Step	Illustration	Handling Instruction
Disassembly of right and left polystyrene foam plates modules		●Remove the right and left polystyrene foam plates modules in the direction given by the graph.

Disassembly of fan and motor components		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the fastening screws for fans.		
Step	Illustration	Handling Instruction
1. Disassembly of front and back scroll cases		●Press the buckle at the joints of front and back scroll cases with hands and pull upward to remove the front scroll case. Then remove the screws on the back scroll case. Lift the buckle of back scroll case with hands and remove it.(As is shown in the graph, circle represents 2 screws on left and right.)
2. Disassembly of fans		●Disassemble the fixing screws of fan wheel with inner hexagonal and remove the wheel. The inner hexagonal and its direction of effect are shown by the arrow in the graph.
3. Disassembly of bearing fixing plates		●Disassemble 4 screws on the bearing fixing plates with screwdriver. (As shown in the box in the graph)

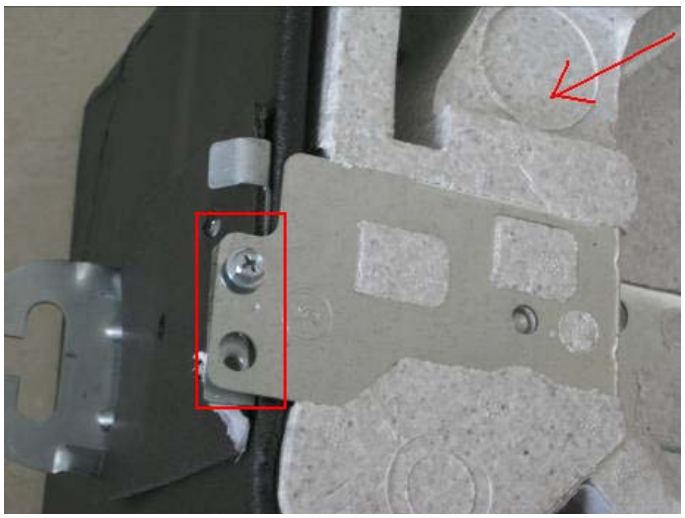
4. Disassembly of motor		●Disassemble the bolt shown in the graph with screwdriver and remove the motor press plate and retaining clio for motor.

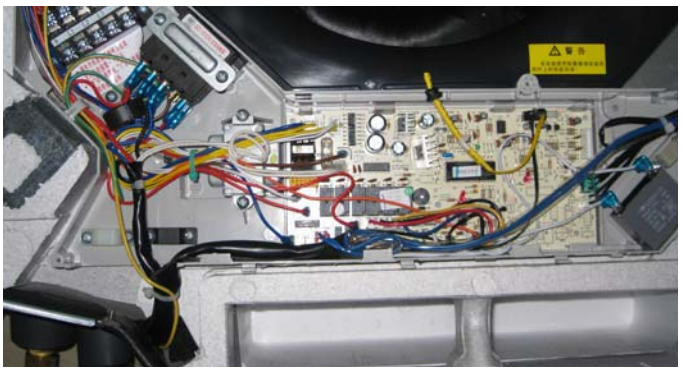
Disassembly of right and left fixing plates		
Remark: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Disassembly of right and left fixing plates		●Disassemble the bolts on right and left fixing plates with tools. (As is shown by the arrow in the graph.)

4.2.3 Cassette Type

Disassembly of panel grating and filter screen		
Remark: Cut off the power supply and make sure the panel grating in good condition during assembly.		
Step	Illustration	Handling Instruction
1. Disassembly of grating		●Push the right and left clips on the panel to the middle and pull upward at the same time. Pull backward when at 45°. (The position of clips is shown by the arrow in the graph.)
2. Disassembly of filter screen		●As directed by the graph, push two clips represented by circles in the direction of arrow with hands. Take filter screen off the pothook represented by the box when it becomes loose. Remove the filter screen.

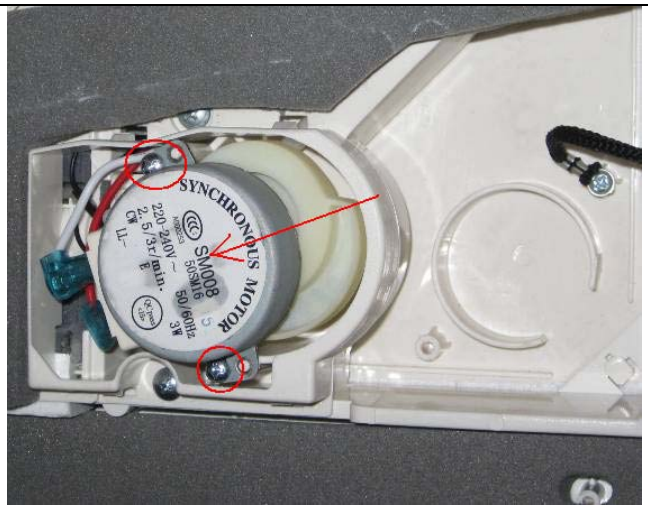
Disassembly of panels		
Remark: Cut off the power supply and make sure the panels and angular shell in good condition.		
Step	Illustration	Handling Instruction
1. Disassembly of angular shell		●Pull angular shell outside with hands and remove it.
2. Disassembly of screws		●Disassemble the screws with screwdriver and loose the fixing clip on the panels. (The position of screws is represented by the arrow.) ●There are 4 fixing clips on panel's four corners. When loosed completely, panel shall be removed by pulling upward.

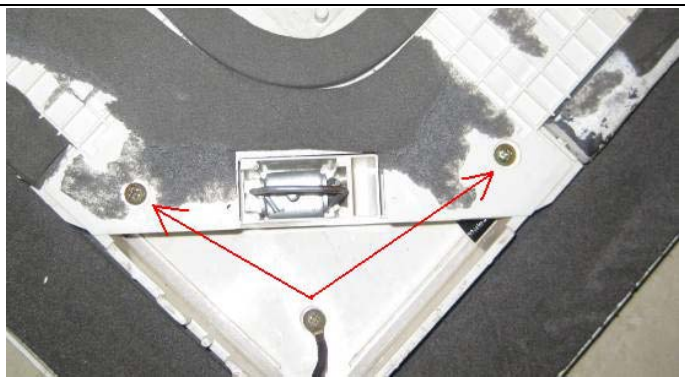
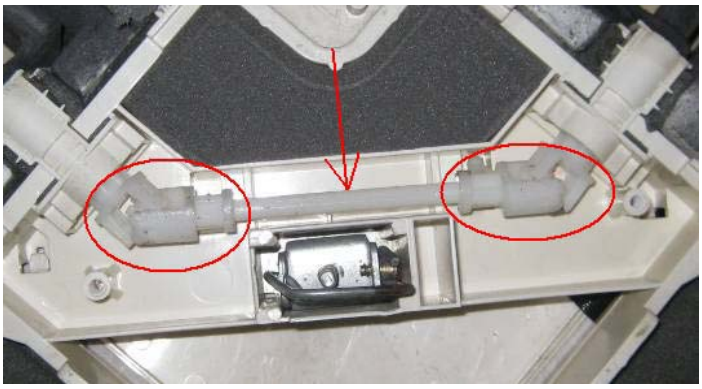
Disassembly of water-containing plate		
Remark: Cut off the power supply and make sure the power supply wires, signal wires and water-containing plate in good condition.		
Step	Illustration	Handling Instruction
1. Disassembly of cover panel of electrical parts box and flow deflecting ring		●Disassemble the screws on the electical parts box cover panel and flow deflectin ring. Remove the electrical parts box and the power supply wires and signal wires inside the electrical parts box connecting with the electrical componets under the water-containing plate.
2. Disassembly of water-containing plate		●Disassemble the screws on the four corners and pull outside the water-containing plate.(As is shown in the graph, arrow represents the water-containing plate. The postition of screws are shown in the box .)

Disassembly of electrical parts box		
Remark: Cut off the power supply and make sure the power supply wires, signal wires and electrical parts box in good condition.		
Step	Illustration	Handling Instruction
Disassembly of electrical parts box		●Disassemble 4 assembling screws and pull upward to remove the electrical parts box.

Disassembly of fan		
Remark: Cut off the power supply and make sure the fan is in good condition and shape.		
Step	Illustration	Handling Instruction
Disassembly of fan		●Disassemble the nuts with wrench and pull upper side to remove the fan (The position of washer nuts is shown by the arrow in the graph.).

Disassembly of motor		
Remark: Cut off the power supply and make sure the motor is in good condition.		
Step	Illustration	Handling Instruction
Disassembly of motor		●Disassemble the screws with wrench and pull upper side to remove the motor.

Disassembly of air-deflecting motor		
Remark: Make sure the air-deflecting motor in good condition and the power supply is cut off.		
Step	Illustration	Handling Instruction
Disassembly of air-deflecting motor		●Disassemble two fitting screws on the air-deflecting motor and remove the motor.

Disassembly of connection rod modules on air-deflecting plate		
Remark: Make sure the air-deflecting plate in good condition and the power supply is cut off.		
Step	Illustration	Handling Instruction
1. Disassembly of screws		●Remove part of the insulating sponge on four corners on the panel and remove the two exposed screws. The connection rod modules on the air-deflecting plate shall be seen. (The position of screws is shown in the graph.)
2. Disassembly of connection rod module		●Pull up the connection rod and separate the connection rod and connection rod modules with hands. Disassemble the connecting screws with screwdriver. (As is shown in the graph, arrow represents the connetion rod and circle the univeral joints.)

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